HP Simply StorageWorks reference guide

Your guide to HP storage solutions for small and
midsized businesses

Spring 2008 Edition

Simply StorageWorks

When faced with growing volumes of data to store and protect, it can be a challenge to find a solution that is easy to set up and manage, and which is also reliable and affordable. HP Simply StorageWorks makes it easy to find the answer to your specific storage challenges with solutions that are grouped into three pillars: **Simply Consolidation, Simply File Services,** and **Simply Business Protection**. Each of these pillars addresses a different business need and provides advice on what storage solutions best fit your environment.

Simply Consolidation brings greater efficiency and flexibility to growing business operations by making it easy for customers to centralize and share storage for multiple application servers. It keeps things simple with entry-level, plug-and-play solutions such as the All-in-One Storage System as well as storage area network (SAN) products that can be ordered with one part number such as SAN starter kits, which will be available in April/May 2008.

Simply File Services helps customers deliver and manage optimized file serving for their end-user clients that is designed to help improve business performance. It is simple, with Microsoft® Windows®-based file servers that are tuned to run up to 20 percent faster than build-it-yourself solutions. It features HP products designed specifically for file serving—HP ProLiant servers integrated with Microsoft Windows Storage Server software. Full index search capabilities help workers find data faster, and HP ProLiant Storage Servers and HP All-in-One Storage Systems are preconfigured to be deployed and managed in minutes, not hours.

Simply Business Protection helps customers keep their businesses running smoothly, with solutions ranging from backup to disaster recovery to long-term archiving. It is simple, with easy-to-use disk and tape-based backup and recovery products designed to fit the unique needs of small and midsized businesses. With a wide range of solutions designed just for them, your customers can select the right amount of capacity, whether it is 40 GB or 80 TB. They also have their choice of technologies—from tape drives and libraries to disk-based backup appliances to data backup software solutions.

Find out more about Simply StorageWorks at: **www.hp.com/go/simplystorageworks**

Index of content

Simply Consolidation

Simply Consolidation provides simple advice on how to implement a SAN solution, giving you shared capacity for your application servers so that they deliver reliability and easier management.

A storage area network (SAN) provides resource sharing that is similar to a local area network (LAN), but is designed specifically for servers to share storage devices such as disk arrays and tape libraries.

HP has introduced SAN solutions based on the iSCSI protocol, which enables smaller IT environments to benefit from shared network storage at an achievable cost.

- The HP StorageWorks MSA2000i (iSCSI) and the MSA2000fc (Fibre Channel) are part of a new generation of storage arrays designed for entry-level customers that features the very latest in functionality and technology at highly affordable investment price points.
- The All-in-One Storage Systems provide affordable, easy-to-use, appliance-based, entry-level consolidation with the added functionality of file serving and integrated data protection.

Both types of SANs enable growing amounts of data to be stored and managed more efficiently. Plus, they reduce operational and management costs and provide the following benefits:

- Online scalability—for the easy addition of extra storage
- High levels of availability—helping to ensure that data and applications are always fully accessible
- Simple and centralized management—saving vital human resources
- High utilization of disk capacity—enables improved cost-efficiency and rapid ROI
- Faster data restoration—allowing businesses to return to full productivity

For more information, visit: **www.hp.com/go/simplystorageworks**

HP StorageWorks Modular Smart Arrays and All-in-One Storage Systems family

Affordable, scalable, and manageable high-performance storage consolidation solutions

All-in-One Storage   **Modular Smart Array**

Midrange consolidation

EVA4400

MSA2000fc

MSA2000i

Entry-level consolidation

AiO1200

AiO600

AiOSB600c

MSA500 G2

AiO400t

AiO400r

MSA70

MSA30

MSA60

Disk enclosures

MSA20

MSA50
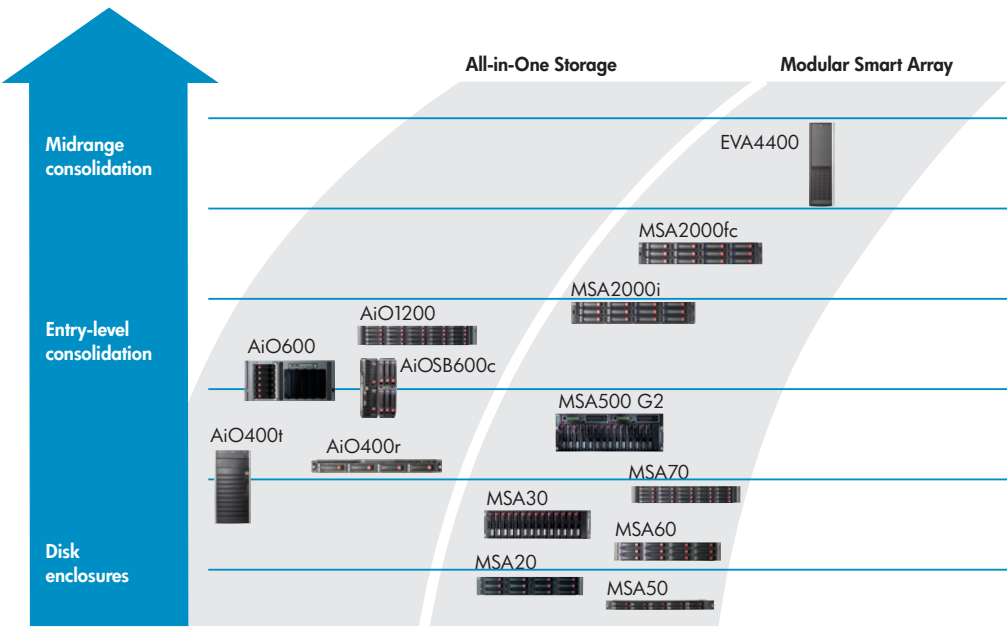
For technical reference, go to quickspecs: **www.hp.com/products/quickspecs**

HP StorageWorks All-in-One Storage Systems family

HP StorageWorks All-in-One Storage Systems (AiO) are radically simple, integrated, and affordable network storage solutions that enable small and midsized companies to manage, grow, and protect their data easily.

The HP StorageWorks 400t, 400r, 600, 1200, and SB600c All-in-One Storage Systems are unified storage devices that provide benefits from all three Simply StorageWorks pillars:

- **Simply Consolidation:** Integrated iSCSI array enables shared storage, which delivers more efficient use of capacity and lower operational costs.
- **Simply File Services:** Optimized file serving for end-user clients (NAS) to improve productivity and collaboration. These systems are performance tuned and improve capacity utilization by reducing duplicate files within shared volumes.
- **Simply Business Protection:** Integrated protection of iSCSI and NAS data while also enabling data protection of other servers and clients to deliver network backup consolidation when paired with HP tape products.

These fully integrated solutions are designed to be deployed by IT generalists and require no storage expertise. They offer everything you need to lower the cost and complexity associated with rapidly growing data environments.

All-in-One Storage Manager
A single interface that manages storage and data protection from an application-centric point of view.
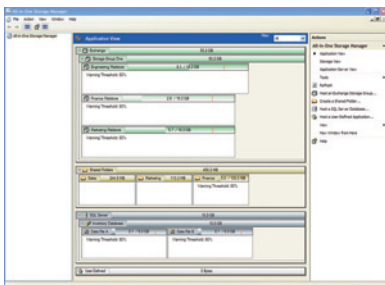
Setup and migration tools
IT generalists can set up storage quickly and easily and migrate data using "best-practice" wizards.
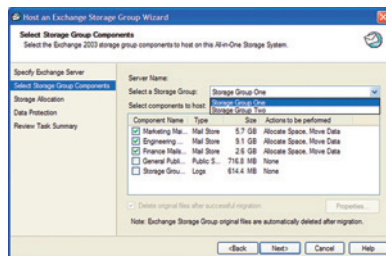
Features and benefits

- **Breakthrough simplicity to lower the cost and complexity of data management:**
  HP All-in-One Storage Manager simplifies the growth, management, and protection
  of data by hiding complexity and reducing barriers to network storage.
- **Integrated and adaptive storage solutions to enable dynamic business growth:**
  These solutions provide utility and flexibility by combining multiple storage functions
  into a single integrated solution. They also allow storage to be a turnkey resource.
- **Affordable and cost-effective solution for growing application environments:**
  Managed through a single interface, they provide multiple storage functions that
  are lower than the cost of separate products and do not require you to change
  your infrastructure.
- **Application-centric storage management simplifies operation and lowers costs:**
  This management uses terms and functions familiar to application administrators
  and has data migration capabilities for key Microsoft applications. It includes iSCSI
  management for heterogeneous environments (Microsoft, Linux, VMware, etc.).

For more information, go to: **www.hp.com/go/AiOstorage**

HP StorageWorks All-in-One Storage Systems

HP StorageWorks All-in-One (AiO) Storage Systems provide shared storage expansion for application servers (iSCSI SAN), enhanced file serving for end-user clients (NAS), and comprehensive data protection features.

NEW: StorageWorks 400t or 400r All-in-One Storage System (AiO400t or AiO400r)

Best suited for customers needing less than 1 TB total raw capacity.

StorageWorks 600 All-in-One Storage System (AiO600)

Best suited for customers looking for increased capacity, scalability, and hardware redundancy.

StorageWorks 1200 All-in-One Storage System (AiO1200)

Best suited for customers looking for increased performance and capacity from 12 internal drives and a high-performance RAID controller.

StorageWorks All-in-One SB600c Storage Blade Solution (AiO SB600c)

Best suited for customers looking for unified file serving and shared storage array features inside of BladeSystem c-Class environments.

Technical specifications

All-in-One Storage System family

File-serving support	SMB/CIFS, NFS, HTTP, FTP
iSCSI host support	Compliant with iSCSI industry standards and compatible with industry-standard iSCSI initiators; additional iSCSI interoperability has been verified for Windows 2000, Windows Server 2003, VMware ESX Server 3, SuSE Linux Enterprise Server 10, Red Hat Enterprise Linux 5, and QLogic 40xx
Data protection features	Hardware RAID, VSS Snapshots (512 per volume), HP Data Protector Express software, Microsoft DFS Replication, and optional HP Storage Mirroring replication
Operating system	Windows Storage Server 2003, Release 2 Standard Edition

Ordering information for AiO400t/400r/600/1200/SB600c

Ordering information AiO400t

AK298A AiO400t 1 TB SATA (Euro)
AK296A AiO400t 1 TB SATA (Amer)
AK297A AiO400t 1 TB SATA (Asia)
AK299A AiO400t 1 TB SATA (China)
AK300A AiO400t 1 TB SATA (Aust)
AK293A AiO400t 584 GB SAS (Euro)
AK291A AiO400t 584 GB SAS (Amer)
AK292A AiO400t 584 GB SAS (Asia)
AK294A AiO400t 584 GB SAS (China)
AK295A AiO400t 584 GB SAS (Aust)

Ordering information AiO400r

AK224A AiO400r 1 TB SATA
AK225A AiO400r 2 TB SATA
AK226A AiO400r 1.2 TB SAS

Ordering information AiO600

AG538A AiO600 1.5 TB SATA
AG543A AiO600 3.0 TB SATA
AG549A AiO600 876 GB SAS
AG727A AiO600 1.8 TB SAS
AG546A AiO Tower-to-Rack Conversion Kit

Ordering information AiO1200

AG655A AiO1200 3 TB SATA
AG656A AiO1200 6 TB SATA
AG657A AiO1200 9 TB SATA
AG658A AiO1200 1.7 TB SAS
AG659A AiO1200 3.6 TB SAS

Ordering information AiO SB600c

AG780A AiO SB600c 1 TB SAS Storage Blade Solution

Optional software components

HP Storage Mirroring
T5321A Storage Mirroring for All-in-One Storage

Options to extend included Data Protector Express software

(Note: No options are required for basic backup and recovery of iSCSI LUNs or NAS file volumes.)

For the protection of networked Windows, Linux, and NetWare servers by backup to AiO storage pool:
• HP Data Protector Express Network Client Agent (**BB121AA**)—one per protected machine

For the protection of networked Microsoft Exchange servers while servers are online by backup to AiO storage pool:
• HP Data Protector Express Microsoft Exchange Online Backup Agent (**BB123AA**)—one per protected machine
• HP Data Protector and Express Network Client Agent (**BB121AA**)—one per protected machine

For protection of Microsoft SQL Servers while servers are online by backup to AiO storage pool:
• HP Data Protector Express Microsoft SQL Online Backup Agent (**BB124AA**)—one per protected machine
• HP Data Protector Express Network Client Agent (**BB121AA**)—one per protected machine

For automated disk-to-disk (AiO storage pool)-to-tape backup:
• HP Data Protector Express D2D2Any Option (**BB128AA**)

Technical specifications

	AiO400t	AiO400r	AiO600
Processor	Dual-core Intel® Pentium® E2160 1.8 GHz	Quad-core Intel® Xeon® E5405 2.00 GHz (one standard; up to two supported)	Dual-core Intel® Xeon® 5150 2.67 GHz One 4 MB L2 cache memory
Memory (std./max.)	2 GB/8 GB	2 GB/32 GB	1 GB/4 GB
Storage controller	Smart Array E200 Controller with 128 MB Battery Backed Write Cache (BBWC)	Smart Array E200 Controller with 128 MB with BBWC	Smart Array E200i Controller with 128 MB BBWC
Internal storage (varies by model)	Four 3.5" (large form factor) non hot-pluggable drive bays • 1 TB SATA model: four 250 GB 7.2k rpm SATA HDDs • 584 GB SAS model: four 146 GB 15k rpm SAS HDDs	Four 3.5" (large form factor) front load, hot-pluggable drive bays • 1 TB SATA model: four 250 GB 7.2k rpm SATA HDDs • 2 TB SATA model: four 500 GB 7.2k rpm SATA HDDs • 1.2 TB SAS model: four 300 GB 15k rpm HDDs	Six 3.5" (large form factor) front load, hot-pluggable drive bays • 1.5 SATA model: 6 x 250 GB 7.2k rpm HDDs • 3 TB SATA model 6 x 500 GB 7.2k rpm HDDs • 876 GB SAS model 6 x 146 GB 7.2k rpm HDDs • 1.8 TB SAS model 6 x 300 GB 15k rpm HDDs
Storage expansion	None	MSA50/60/70	MSA20/30/50/60/70
Network controller	• Embedded NC105i PCIe Gigabit Ethernet Server Adapter • Additional NC360T Dual Port Gigabit Ethernet Server Adapter	• Embedded NC320i PCIe Dual Port Gigabit Ethernet Server Adapter	• Embedded NC373i Multifunction Gigabit Network Adapter • Additional Dual-Port NC360T 10/100/1000T
Form factor	Micro ATX tower	1U rack	5U (tower or rack)

Technical specifications

AiO1200 | ## AiO SB600c

	AiO1200	AiO SB600c
Processor	Dual-core Intel® Xeon® 3070 2.67 GHz	Quad-core Intel® Xeon® 5345 2.33 GHz (one standard; up to 2 supported)
Memory (std./max.)	2 GB/4 GB	2 GB/4 GB
Storage controller	HP Smart Array P400/512 MB with BBWC	• Integrated HP Smart Array E200i Controller with 128 MB BBWC • Smart Array P400/256 MB with BBWC

Internal storage* (varies by model)	Twelve 3.5" (large form factor) front load, hot-pluggable drive bays
	• 3 TB SATA model:
	  12 x 250 GB 7.2k rpm HDDs
	• 6 TB SATA model:
	  12 x 500 GB 7.2k rpm HDDs
	• 9 TB SATA model:
	  12 x 750 GB 7.2k rpm HDDs
	• 1.7 TB SAS model:
	  12 x 146 GB 15k rpm HDDs
	• 3.6 TB SAS models:
	  12 x 300 GB 15k rpm HDDs
		• Two Small Form Factor (SFF) 146 GB 10K SAS hot-pluggable hard disk drives (in SB600c server blade)
		• Six Small Form Factor (SFF) 146 GB 10K SAS hot-pluggable hard disk drives (in SB600c storage blade)

Storage expansion	MSA50/60/70	None
Network controller	Embedded NC324i PCIe Dual-Port Gigabit Server Adapter	Two embedded NC373i Multifunction Gigabit Server Adapters with TCP/IP offload engine
Form factor	2U (rack)	One half-height BladeSystem c-Class server blade and one half-height BladeSystem c-Class storage blade

HP StorageWorks Modular Smart Array (MSA) family

The HP StorageWorks MSA family of enclosures delivers industry-leading availability, storage density, and upgradability to meet customers' demanding and growing storage needs.

Ideal for entry-level businesses, departmental, and branch-office customers, MSA models range from low-cost SATA drive storage enclosure models to high-performance disk arrays, and all offer:

• High Availability standard with hot-pluggable and redundant power supplies and cooling fans

For more details about the MSA family, visit: **www.hp.com/go/msa2000**

For configuration tools, visit: **www.hp.com/go/nsssizer**

For supported environments, server configurations and storage controllers, visit: **www.hp.com/products/quickspecs** and click on Storage Products.

Direct server connect

SCSI shared storage array

iSCSI SAN arrays

Fibre Channel SAN arrays

MSA2000fc

MSA70

MSA60

MSA2000i

MSA50

MSA30

MSA500 G2

MSA20

Availability and performance
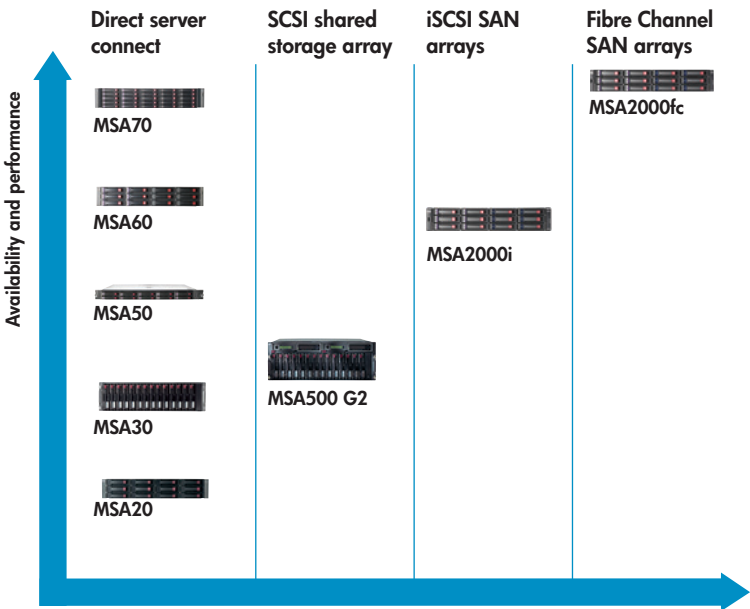
HP StorageWorks MSA20 and MSA30

These external disk enclosures provide additional storage capacity for servers as well as for MSA SAN arrays. They eliminate the need to buy new servers when only additional storage is required, and their modular design enables expansion from a few disks to multiple terabytes.

HP StorageWorks MSA20

HP StorageWorks MSA30

Key features and benefits

- **A common storage platform** that allows for future storage consolidation to a SAN
- **Hot-pluggable disk drives**, power supplies, and fans
- **Redundant fans** and redundant power supplies
- **Dual-power hot-pluggable supplies** that are sufficient to provide power to the enclosure and maintain normal operating levels
- **Environmental Monitoring Unit (EMU)** monitors environmental conditions within the enclosure and the components, such as the power supply and fans

Technical specifications

	MSA20	MSA30	MSA30 MI
Total drive count	12 SATA	14 SCSI	14 SCSI
Drives used	3.5" LFF	3.5" LFF	3.5" LFF
Rack height	2U	3U	3U
Maximum storage	9 TB	4.2 TB	4.2 TB
Storage controller	SCSI Smart Array controller (server based)		
RAID	0, 1, 1+0, 5, 6 (ADG)		
OS Support	Windows Linux NetWare SCO	Windows Linux NetWare HP-UX OpenVMS	HP-UX OpenVMS

Ordering information MSA20

335921-B21 HP StorageWorks MSA20 Enclosure
Supported SATA 3.5" LFF Hard Disk Drives:
432341-B21 HP 750 GB SATA 7.2K
395473-B21 HP 500 GB SATA 7.2K
349239-B21 HP 250 GB SATA 7.2K

Ordering information MSA30

302969-B21 HP StorageWorks MSA30 SB Enclosure (single bus)
302970-B21 HP StorageWorks MSA30 DB Enclosure (dual bus)
359645-B21 HP StorageWorks MSA30 MI Enclosure
Supported U320 Universal Hard Disk Drives:
411089-B22 HP 300 GB SCSI 15K
347708-B22 HP 146 GB SCSI 15K
286778-B22 HP 72 GB SCSI 15K
286776-B22 HP 36 GB SCSI 15K
350964-B22 HP 300 GB SCSI 10K
286716-B22 HP 146 GB SCSI 10K
286714-B22 HP 72 GB SCSI 10K

HP StorageWorks MSA50, MSA60, and MSA70

These high-availability, high-performance, and high-capacity SAS disk enclosures support your existing and future storage needs.

HP StorageWorks MSA50

Key features and benefits

- **Support for SAS AND SATA mix** in the same enclosure (MSA50 and MSA60 only), which delivers data-transfer rates of up to 3 Gb/s
- **Provides storage capacity** of up to 9 TB per enclosure
- **Multi-terabyte scalability** by cascading several enclosures (1 + 3) x 12 = 48 disk slots behind a single SAS controller port for a potential total capacity of 36 TB (MSA60 only)
- **A common storage platform** that allows for future storage consolidation to a SAN
- **SFF drives** allow increased air flow through the storage unit for better cooling and reliability
- **Hot-pluggable disk drives,** fans and power supplies
- **Easy removal of parts** provides better serviceability, with no tools required
- **Small Form Factor (SFF)** at 2.5 inches enables growth in space-constrained environments, lower power consumption, and higher I/O performance with more disk drives per unit space
- **Large Form Factor (LFF)** at 3.5 inches enables multi-terabyte capacity, high megabyte-per-second performance, and effective cost-per-gigabyte ratio

Technical specifications

HP StorageWorks MSA50

Total drive count	10 SAS/SATA
Drive form factor*	SFF
Rack height	1U
Maximum storage	1.4 TB (using 146 GB SAS SFF disk drives)
Storage controller	SAS Smart Array controller P600, P800, or E500 on server
RAID	0, 1, 1+0, 5, 6 (ADG)
OS support	Windows, Linux, NetWare

HP StorageWorks MSA60

HP StorageWorks MSA70

Technical specifications

HP StorageWorks MSA60	HP StorageWorks MSA70
12 SAS/SATA	25 SAS/SATA
LFF	SFF
2U	2U
9 TB (using 750 GB SATA LFF disk drives)	3.6 TB (using 146 GB SAS SFF disk drives)
SAS Smart Array controller P600, P800, or E500 on server	SAS Smart Array controller P600, P800, or E500 on server
0, 1, 1+0, 5, 6 (ADG)	0, 1, 1+0, 5, 6 (ADG)
Windows, Linux, NetWare, SCO	Windows, Linux, NetWare, SCO

Ordering information MSA60

418408-B21 HP StorageWorks MSA60 Enclosure
Supported SAS and SATA 3.5" LFF Hard Disk Drives:
431944-B21 HP 300 GB SAS 15K SP
375872-B21 HP 146 GB SAS 15K SP
375870-B21 HP 72 GB SAS 15K SP
375868-B21 HP 36 GB SAS 15K SP
416127-B21 HP 300 GB SAS 15K DP
384854-B21 HP 146 GB SAS 15K DP
384852-B21 HP 72 GB SAS 15K DP
432341-B21 HP 750 GB SATA 7.2K
395473-B21 HP 500 GB SATA 7.2K
349239-B21 HP 250 GB SATA 7.2K

Ordering information MSA70

418800-B21 HP StorageWorks MSA70 Enclosure
Supported SAS and SATA 2.5" SFF Hard Disk Drives:
431935-B21 HP 72 GB SAS 15K SP
431933-B21 HP 36 GB SAS 15K SP
431958-B21 HP 146 GB SAS 10K SP
375861-B21 HP 72 GB SAS 10K SP
375859-B21 HP 36 GB SAS 10K SP
418371-B21 HP 72 GB SAS 15K DP
418369-B21 HP 36 GB SAS 15K DP
418367-B21 HP 146 GB SAS 10K DP
384842-B21 HP 72 GB SAS 10K DP
431786-B21 HP 120 GB SATA 5K
379306-B21 HP 60 GB SATA 5.4K

HP StorageWorks MSA2000i

The HP MSA2000i is the iSCSI member of a new generation of storage arrays. It allows networked storage to be deployed on a familiar and cost-effective IP infrastructure. The MSA2000i is specifically designed for entry-level customers and features the very latest in functionality and technology at highly affordable investment price points.

Key features and benefits

- **For entry-level IP SAN needs:** The MSA2000i is a low-cost, scalable storage consolidation system that utilizes Ethernet connectivity to build your SAN. It supports a choice of SAS drives for high-speed heavy duty work, and SATA drives for archival storage.

- **Simple management:** By utilizing the Ethernet protocol combined with the powerful but easy-to-use management, MSA2000i software makes it ideal for departmental and remotely located IP SANs. It features the latest in browser-based controller communication, so access is not restricted geographically.

- **Scalability:** With the addition of up to three drive enclosures, the MSA2000i can control up to 48 drives and scale capacity to over 14 TB of SAS or 36 TB of SATA.

- **Platform support:** The MSA2000i supports all HP ProLiant servers running Windows or Red Hat and SuSE Linux in single-server or clustered implementations.

- **High availability:** In addition to having redundant fans, power supplies, and other hot-pluggable components, the MSA2000i also provides controller-based snapshot and clone capabilities for increased data protection.

- **Complete solution:** All configuration, management, and partitioning and expansion capability comes as standard, without unexpected extra charges.

Technical specifications

Total drive count	48 SAS or SATA drives (with additional enclosures)
Rack height	2U
Maximum storage	3.6 TB SAS scalable to 14.4 TB 9 TB SATA scalable to 36 TB
RAID	0, 1, 3, 5, 6, 10, 50

Ordering information

AJ746A HP 2012i SC Modular Smart Array

AJ747A HP 2012i DC Modular Smart Array

AJ748A HP 2000i Modular Smart Array Controller

AJ749A HP StorageWorks MSA2000 Single I/O 3.5" 12-Drive Enclosure

AJ750A HP StorageWorks MSA2000 Dual I/O 3.5" 12-Drive Enclosure

AJ751A HP StorageWorks MSA2000 Drive Enclosure I/O Module

AJ735A MSA2000 146GB 15K SAS 3.5" HDD

AJ736A MSA2000 300GB 15K SAS 3.5" HDD

AJ738A MSA2000 500GB SATA 3.5" HDD

AJ739A MSA2000 750GB SATA 3.5" HDD

The HP StorageWorks MSA2000fc

The HP MSA2000fc is the newest Fibre Channel addition to the Modular Smart Array family, bringing high-speed 4 Gb Fibre Channel to an array specifically designed for entry-level users. It features the very latest in functionality and a mature technology at highly affordable investment price points.

Key features and benefits

- **Consolidated storage:** 4 Gb Fibre Channel technology provides high-speed access to data stored on enterprise-class SAS drives or SATA drives for inexpensive archiving. Its low cost and modular architecture make it ideal for users who need a storage solution that is able to start small and expand as their needs grow.

- **Scalability:** You can start with a single-controller array with space for 14 hard drives. You can then add a second controller and grow to 48 drives, increasing capacity to over 14 TB of SAS or 36 TB of SATA as your needs expand.

- **Simple management:** Powerful but easy-to-use management software makes it ideal for departmental and remote location SANs.

- **OS and server support:** The MSA2000fc supports all HP ProLiant servers, including server blades running Windows or Red Hat and SuSE Linux in standalone servers or clustered implementations.

- **High availability:** In addition to having redundant fans, power supplies, and other hot-pluggable components, the MSA2000fc also provides controller-based snapshot and clone capabilities for increased data protection.

- **Complete solution:** All configuration, management, and partitioning and expansion capability comes as standard, without unexpected extra charges.

Technical specifications

Total drive count	48 SAS or SATA drives (with additional enclosures)
Rack height	2U
Maximum storage	3.6 TB SAS scalable to 14.4 TB 9 TB SATA scalable to 36 TB
RAID	0, 1, 3, 5, 6, 10, 50

Ordering information

AJ742A HP 2012fc SC Modular Smart Array

AJ743A HP 2012fc DC Modular Smart Array

AJ744A HP 2000fc Modular Smart Array Controller

AJ745A HP 2212fc Dual Enhanced Controller Modular Smart Array

AJ749A HP StorageWorks MSA2000 Single I/O 3.5" 12-Drive Enclosure

AJ750A HP StorageWorks MSA2000 Dual I/O 3.5" 12-Drive Enclosure

AJ751A HP StorageWorks MSA2000 Drive Enclosure I/O Module

AJ735A MSA2000 146GB 15K SAS 3.5" HDD

AJ736A MSA2000 300GB 15K SAS 3.5" HDD

AJ738A MSA2000 500GB SATA 3.5" HDD

AJ739A MSA2000 750GB SATA 3.5" HDD

HP StorageWorks 8 Gb Simple SAN Connection product family

HP simplifies SANs by combining 8 Gb Fibre Channel performance with end-to-end SAN management in a solution capable of supporting emerging technologies at today's 4 Gb pricing. The HP StorageWorks 8 Gb Simple SAN Connection product family makes installing and managing your SAN easy.

Key features and benefits

- **High performance at affordable pricing:** State-of-the-art 8 Gb Fibre Channel technology provides the bandwidth needed to support emerging technologies.
- **Enterprise-class features:** Powerful switch and HBA features help you get the most out of your SAN.
- **Integrated end-to-end management:** You can configure and monitor HP switches, HBAs, and storage from a convenient unified dashboard.
- **Ease of deployment:** You can eliminate the risk of expensive configuration errors with point-and-click wizards.
- **Aggressively priced bundle:** The 8 Gb Simple SAN Connection Kit includes everything required for a 4-host SAN infrastructure, including 8 Gb HBAs, cables, and SFPs—just add your choice of HP storage.
- **Scalability:** As your needs change, you can expand using four-port license keys that provide up to 20 ports per chassis, then link additional switches and HBAs to create a larger SAN of any topology.
- **Investment protection:** The 8 Gb Simple SAN Connection products are priced competitively with previous generation products.

Ordering information

AK241A HP StorageWorks 8 Gb Simple SAN Connection Kit
AK242A HP StorageWorks 8/20Q Fibre Channel Switch
AK344A HP StorageWorks 81Q PCI-e FC HBA
T5463A HP StorageWorks 8/20Q 4-port Upgrade LTU
AJ718A HP 8 Gb Short Wave FC SFP+ 1 Pack

HP StorageWorks 81Q PCI-e Fibre Channel Host Bus Adaptor

HP StorageWorks 8/20Q Fibre Channel Switch

Technical specifications

HP StorageWorks 8/20Q Fibre Channel Switch

Performance	8 Gb/s
Max. ports	20
Min. ports	8
Aggregate switch bandwidth	320 Gb/s
Form factor	1U

HP StorageWorks 81Q PCI-e Fibre Channel HBA

Number of channels	Single
Port speed	8 Gb/s
Slot type supported	PCI Express to Fibre Channel
Servers supported	HP ProLiant ML and DL platforms

HP StorageWorks 4400 Enterprise Virtual Array

The HP StorageWorks EVA4400 provides an enterprise-class virtual storage array that can be deployed easily at an affordable price for the midsized customer.

Key features and benefits

- **Affordable enterprise-class storage array functionality:** The EVA4400 is easy to install, upgrade, and manage, at an affordable price for midsized customers.
- **Virtualization improves capacity and reduces management complexities:** Reduces complexities of installations by employing EVA virtualization capabilities to improve management resources.
- **Less time managing storage:** Installation is quick and easy, taking only a few hours. It's easy to upgrade, repair, and replace components without the need for a service call.
- **Lower cost of ownership:** Contributing to an attractive total cost of ownership, the EVA4400 is more affordable and less complex than traditional arrays.
- **Simplified integration of leading business applications:** EVA4400 Solution Blocks provide blueprints for integration with Microsoft Exchange, Oracle,® and SAP that combines the right server, storage, and application components for quick deployment of typical business projects.
- **Storage that keeps pace in the agile world of virtual servers:** In a dynamic VMware environment, the most complementary storage is one that can respond quickly to change. The EVA4400 makes it easy to configure and provision storage.
- **Complete solution for storage and servers:** Combined with HP BladeSystem, the EVA4400 provides a complete solution where storage and servers are managed together.
- **Easy and robust disaster recovery:** Local and remote replication software, HP StorageWorks Business Copy EVA and Continuous Access EVA, protect data, so in the event of a service disruption, recovery is quick and easy.
- **High availability for planned uptime:** High availability with a dual-redundant architecture of high-end arrays that supports robust local and remote replication capabilities.
- **8 Gb/s ready:** Embedded switch model includes two 8 Gb/s embedded 10-port B-series SAN switches, providing access to the industry's fastest-performing SAN infrastructure.

Technical specifications

Total drive count	96 FC or FATA drives
Rack height	2U (2 controllers per enclosure)
Maximum storage	1 to 96 TB
RAID	Vraid1, Vraid 0+1, Vraid5, Cross Vraid

Ordering information

AG637A EVA4400 dual controller assembly (2U)

AG638A M6412 FC Drive Enclosure (2U)

AJ711A HP StorageWorks 400 GB 10K FC EVA M6412 Hard Disk Drive

AG556A HP StorageWorks 146 GB 15K rpm 4 Gb dual-port FC EVA M6412 Hard Disk Drive

AG690A HP StorageWorks 300 GB 15K rpm 4 Gb dual-port FC EVA M6412 Hard Disk Drive

AG803A HP StorageWorks 450 GB 15K rpm 4 Gb dual-port EVA M6412 Enclosure Hard Disk Drive

AG691A HP StorageWorks 1 TB FATA dual-port EVA M6412 Enclosure Hard Disk Drive

HP storage networking

As the worldwide leader in storage area networks (SANs), HP StorageWorks delivers flexible, open, standards-based storage networking solutions that are suitable for any business size.

HP's comprehensive family of SAN products and solutions is designed to meet a range of storage networking needs from small and medium-sized businesses to the largest enterprise businesses. HP StorageWorks SAN solutions deliver the scalability, performance, and broad functionality required for critical data and applications.

Key features and benefits

- **Upgradeable:** investment protection through backwards compatibility with older-generation switches and ability to upgrade device firmware without disruption
- **Reduced complexity:** architectural guidance through the SAN Design Guide, solution-focused blueprints, and essential flexible SAN design and efficiency resources such as SAN Designer and SAN Visibility
- **High availability:** industry-leading availability levels through director-class products and redundant-fabric SAN topology designs
- **Secured:** authentication, authorization, access control, zoning, and data encryption provide added levels of network security
- **Open:** support for multiple operating systems and clustering environments; new standards-based fabric interoperability among B-series, M-series, and C-series for outstanding flexibility and investment protection; refer to SAN Design Guide for currently supported configurations
- **Scalable:** in distance, connectivity, and performance to enable both today's and tomorrow's connectivity needs
- **Multiprotocol:** ability to support multiprotocol infrastructures, including Fibre Channel, iSCSI, and Fibre Channel over IP (FCIP)

For detailed information, white papers, and other content on HP's approach and added value for the SAN infrastructure, see: **www.hp.com/go/san**

For technical references, see the quickspecs: **www.hp.com/products/quickspecs**

Simply
Consolidation

Simply File
Services

Simply Business
Protection

What's in the box

Jargon buster

HP Care Pack
Services

21

HP StorageWorks SAN Design Guide

As the worldwide leader in SANs, HP StorageWorks delivers the flexible, open, standards-based storage infrastructure solutions suitable for any business size. This leadership is demonstrated and published in the HP StorageWorks SAN Design Guide.

HP continues driving simplicity in network storage by providing a completely new edition of the SAN Design Guide (SDG). The SDG provides customers with the benefit of HP engineering guidance, when building and designing scalable, highly available enterprise SANs. More specifically, it provides:

• Architecture guidance
• Massive configuration support
• Implementation best practices
• SAN rules for incorporating new multiprotocol technologies

For in-depth information about HP's qualified SAN architectures and best practices, consult the SAN Design Guide: **www.hp.com/go/sandesignguide**

SAN Visibility and SAN Designer

SAN Visibility and SAN Designer are essential, flexible resources that help users configure and improve the efficiency of their SANs. These easy-to-navigate, intuitive interfaces simplify the configuration and analysis processes.

SAN Visibility

SAN Visibility is a SAN data analysis tool that analyzes your SAN configuration securely, providing an automated inventory process for switches, HBAs, and storage systems, including firmware version verification.

SAN Designer

SAN Designer provides quick and easy ways to design SANs based on specific performance, cost, and future storage needs. The tool generates a SAN topology diagram, a detailed list of required SAN components, as well as recommendations for planning future growth requirements.

For additional information, refer to the Storage Networking Blueprints and Solutions page: **www.hp.com/go/san**

HP StorageWorks
B-series infrastructure

The HP StorageWorks B-series switch family provides a comprehensive range of SAN solutions—from flexible SAN switches, software features, and embedded switches to enterprise-class director switches.

Key features and benefits

B-series SAN directors and SAN switches provide a flexible, intelligent platform for networking storage. With models ranging from entry-level 8-port SAN switches to 384-port directors with multiple blade options, the B-series family addresses the needs of small departments and global enterprise businesses alike.

Key features include:

- Multiprotocol support (Fibre Channel, FCIP, and iSCSI)
- Flexible, scalable with investment protection
- LSANs (Logical SANs)
- 1 Gb/s, 2 Gb/s and 4 Gb/s auto-sensing performance

B-series software features

- Power Pack: includes a specially priced bundle featuring Advanced Performance Monitoring, Fabric Watch, ISL Trunking, and Extended Fabric
- Advanced Performance Monitoring: provides complete resource utilization analysis to measure end-to-end service levels and optimize performance in large SANs
- Fabric Watch: proactively monitors the health and performance of switches and the SAN fabric and sends alerts about potential faults
- Extended Fabric: increases SAN fabric coverage over longer distances—up to 500 km
- ISL Trunking: logically groups up to eight e-ports to provide up to 32 GB/s bandwidth in a single logical pipe
- Extended Fabrics: extends SANs to provide "native" Fibre Channel distances up to 500 km

Enterprise class	4/256 SAN Director
	4/64 SAN Switch
Midrange	4/32B SAN Switch
	4/16 SAN Switch
	4/8 SAN Switch
Entry-level	
Embedded	2/8 MSA SAN Switch — Brocade 4 GB SAN Switch for HP BladeSystem p-Class — Brocade 4 GB SAN Switch for HP BladeSystem c-Class

Port count (maximum): > 10   30   < 70
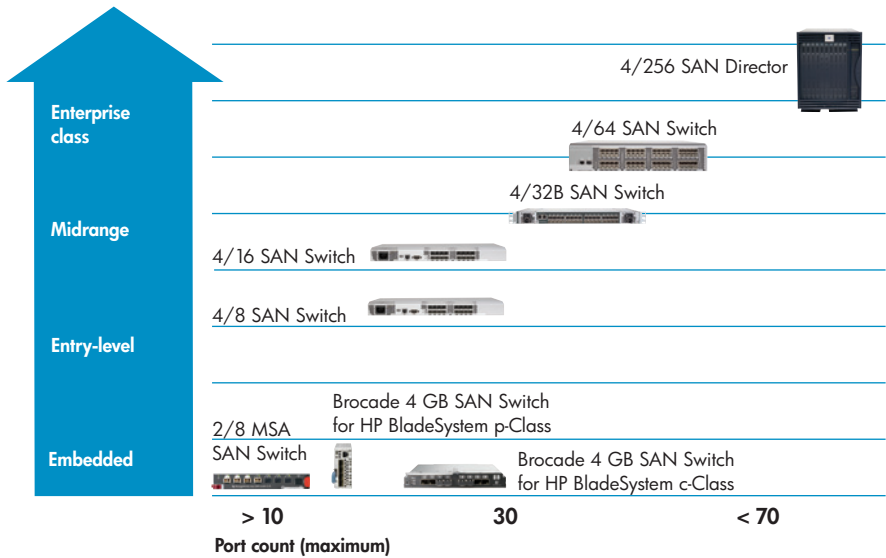
HP B-series SAN Switches for BladeSystems

HP B-series SAN Switches for BladeSystems maximize server consolidation and efficiency. Introducing the Brocade 4 GB SAN Switch for HP BladeSystem c-Class, the most expandable embedded SAN switch module for a server blade in the market.

Brocade 4 GB SAN Switch for HP BladeSystem p-Class

Brocade 4 GB SAN Switch for HP BladeSystem c-Class

Technical specifications

	Brocade 4 GB SAN Switch for HP BladeSystem p-Class		**Brocade 4 GB SAN Switch for HP BladeSystem c-Class**	
Description	Embedded switch providing SAN Fibre Channel connectivity for blade servers		Embedded switch providing SAN Fibre Channel connectivity for blade servers	
HP Part numbers	12 ports base	A7533A	12 ports full-fabric enabled	AE370A
	12 ports full-fabric	A7534A	24 ports full-fabric enabled	AE327A
	12 ports Power Pack	A7535A	24 ports Power Pack	AE371A
No. of ports	12 (4 external/8 internal)		12 (any combination internal/external) 24 (16 internal/8 external) software upgradable	
Performance	1, 2, 4 Gb/s auto-sensing		1, 2, 4 Gb/s auto-sensing	
Hardware redundancy	Hot-pluggable/redundant power supply in BladeSystem enclosure		Hot-pluggable/redundant power supply in BladeSystem enclosure	
Included software	Fabric OS Zoning Web Tools		Fabric OS Hardware Enforced Zoning Web Tools Dynamic Path Selection	
Optional software	Base switch to full-fabric license	T4261A	12-port upgrade license for AE370A	AE373A
	Power Pack Software Bundle	T3573A	Power Pack Software Bundle	T3573A
Optical connectivity	SFP 4 Gb/s Short-Wave	A7446B	SFP 4 Gb/s Short-Wave	A7446B
	2 Short-Wave SFPs included in all models		2 Short-Wave SFPs included in 12-port models 4 Short-Wave SFPs in 24-port models	
	SFP 4 Gb/s Long-Wave	AE493A	SFP 4 Gb/s Long-Wave	AE493A

HP B-series SAN Switches

High-performance 8- to 64-port SAN switches meet high port-count needs for growing enterprise businesses. The new 4 Gb/s HP StorageWorks 4/64 SAN Switch delivers the best performance and value in a 32- to 64-port SAN switch.

HP StorageWorks SAN Switch 4/8, 4/16

HP StorageWorks SAN Switch 4/32B

Technical specifications

Description	B-Series 4/8 and 4/16 SAN Switches		B-Series 4/32B SAN Switch	
HP Part numbers	8 ports base "0 e-port"	A7984A	16 ports full-fabric	AG756A
	8 ports full-fabric	A8000A	32 ports full-fabric	AG757A
	16 ports full-fabric	A7985A	32 ports Power Pack	AG758A
	16 ports Power Pack	A7987A		
No. of ports	8, 12, 16 software upgradable		6, 24, 32 software upgradable	
Performance	1, 2, 4 b/s auto-sensing		1, 2, 4 Gb/s auto-sensing	
Hardware redundancy	N/A		Redundant hot-swappable fans and power supplies	
Included software	Fabric OS Hardware Enforced Zoning Web Tools		Fabric OS Hardware Enforced Zoning Web Tools	
Optional software	Power Pack Software Bundle	T3573A	Power Pack Software Bundle	313448-B21
	4-port upgrade license	T4260A	8-port upgrade license	T3677A
	Base switch to full-fabric license	T4261A	Secure Fabric OS	332925-B21
			Fabric Manager (10 domain)	T4270A
	Secure Fabric OS	332924-B21	Fabric Manager (unlimited)	T4269A
	Fabric Manager (10 domain)	T4270A		
	Fabric Manager (unlimited)	T4269A		
Optical connectivity	SFP 4 Gb/s Short-Wave	A7446B	SFP 4 Gb/s Short-Wave	A7446B
	SFP 4 Gb/s Long-Wave	AE493A	SFP 4 Gb/s Long-Wave	AE493A

HP StorageWorks SAN Switch 4/64

Technical specifications

Description	B-Series 4/64 SAN Switch	
HP Part numbers	32 ports full-fabric	AE495A
	64 ports full-fabric	AG457A
	32 ports Power Pack	AE496A
No. of ports	32, 48, 64 software upgradable	
Performance	1, 2, 4 Gb/s auto-sensing	
Hardware redundancy	Redundant hot-swappable fans and power supplies	
Included software	Fabric OS	
	Hardware Enforced Zoning	
	Web Tools	
Optional software	Power Pack Software Bundle	T4412A
	16-port upgrade license	T4411A
	Secure Fabric OS	332925-B21
	Fabric Manager (10 domain)	T4270A
	Fabric Manager (unlimited)	T4269A
Optical connectivity	SFP 4 Gb/s Short-Wave	A7446B
	SFP 4 Gb/s Long-Wave	AE493A

HP StorageWorks C-series infrastructure

Choosing a Cisco MDS 9000 storage interconnect solution within the HP StorageWorks family brings you the technology of the IP networking market leader as well as the support of a leading systems and storage manufacturer.

Key features and benefits

The C-series family expands on the broad HP portfolio of SAN infrastructure solutions. These solutions provide high performance and scalability and deliver intelligent network services such as:

- Multiprotocol and multi-transport integration (Fibre Channel, iSCSI, and FCIP)
- Virtual SANs (VSANs)
- Advanced traffic management
- Embedded diagnostics
- Role-based security

		Cisco MDS 9509 Director Switch	
Enterprise class	Cisco MDS 9506 Director Switch		Cisco MDS 9513 Director Switch
	Cisco MDS 9222i Fabric Switch		
Midrange			
Entry-level	Cisco MDS 9124 Fabric Switch		
Embedded	Cisco MDS 9124e Fabric Switch for HP BladeSystem c-Class		
	> 20	**50**	**100**	**< 500**

Port count
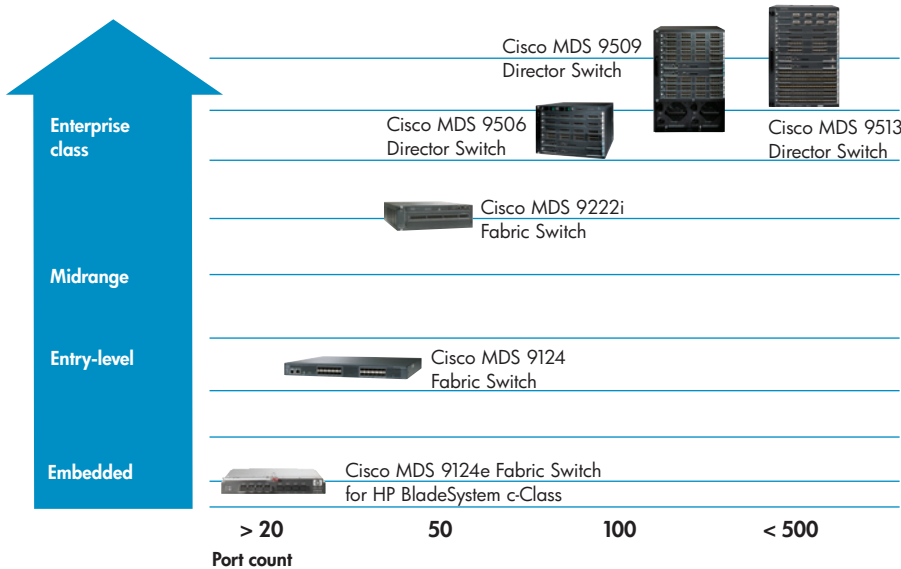
HP C-series Fabric Switches for BladeSystem

HP C-series Fabric Switch for HP BladeSystem c-Class maximizes server consolidation and efficiency. The switch has an integrated design to decrease complexity and reduce costs.

Cisco MDS 9124e Fabric Switch for HP BladeSystem c-Class

Technical specifications

Description	Cisco MDS 9124e Fabric Switch for HP BladeSystem c-Class	
HP Part numbers	12 ports	AG641A
	24 ports	AG642A
No. of ports	12 ports (8 internal/4 external)	
	24 ports (16 internal/8 external) software upgradable	
Performance	1, 2, 4 Gb/s auto-sensing	
Hardware redundancy	Hot-pluggable/redundant power and cooling from BladeSystem enclosure	
Included software	SAN OS 3.1, Virtual SANs, PortChannels, Quality of Service (QOS), Security, Embedded Diagnostics	
	Cisco Fabric Manager	
Optional software	Cisco MDS 9124e 12-port upgrade LTU	T5169A
	Cisco MDS 9100 Enterprise Package for 1 switch LTU	A7515A
	Cisco Fabric Manager Server for 1 Switch LTU	A7512A
Optical connectivity	SFP 4 Gb/s Short-Wave (4-pack) 500 m	AE379A
	SFP 4 Gb/s 4 km	AE494A
	SFP 4 GB/s Long-Wave 10 km	AE380A
Optional accessories	Cisco MDS 9000 Port Analyzer	A7430A

Note: The MDS 9124e Fabric Switch is an embedded switch, not a standalone switch.

Cisco MDS 9124 Fabric Switch C-Series

Technical specifications

Description	Cisco MDS 9124 Fabric Switch C-Series	
HP Part numbers	8 ports	AG646A
	16 ports	AG647A
	24 ports	AG648A
No. of ports	8 to 24 ports software upgradable	
Performance	11, 2, 4 Gb/s auto-sensing	
Hardware redundancy	Redundant power supply (optional)	
	Cooling fans	
Included software	SAN-OS 3.1	
	Virtual SANs	
	PortChannels	
	Quality of Service (QOS)	
	Security	
	Embedded Diagnostics	
	Cisco Fabric Manager	
Optional software	Cisco MDS 9124 8-Port Upgrade LTU	T5171A
	Cisco MDS 9100 Cisco Fabric Manager Server for 1 switch LTU	A7512A
	Enterprise Package for 1 switch LTU	A7515A
Optical connectivity	SFP 4 Gb/s Short-Wave (4-pack) 500 m	AE379A
	SFP 4 Gb/s 4 km	AE494A
	SFP 4 GB/s Long-Wave 10 km	AE380A
Optional accessories	Cisco MDS 9124 2nd/Spare Power Supply	AG649A
	Cisco MDS 9000 Port Analyzer	A7430A

For a full overview on these enterprise products, please refer to the quickspecs pages at:
www.hp.com/products/quickspecs

HP StorageWorks Fibre Channel host bus adapters (HBAs)

The HP StorageWorks Fibre Channel HBA product family provides high-performance connectivity for a range of operating environments. These enterprise-class products intelligently connect storage, servers, and networks.

HP Fibre Channel HBA family

Part number	Name	Technology	PCI bus	Channels
AB378B	PCI-X single-port, 4 GB Fibre Channel adapter	4 GB	PCI-x	Single
AB379B	PCI-X dual-port, 4 GB Fibre Channel adapter	4 GB	PCI-x	Dual
AB429A	HP FC1143 4 GB PCI-X 2.0 HBA	4 GB	PCI-x	Single
AD167A	HP FC2143 4 GB PCI-X 2.0 HBA	4 GB	PCI-x	Single
AD168A	HP FC2243 4 GB PCI-X 2.0 HBA	4 GB	PCI-x	Dual
AE369A	HP FC1243 4 GB PCI-X 2.0 HBA	4 GB	PCI-x	Dual
A8002A	HP FC2142 PCI-e 4 GB HBA	4 GB	PCI-e	Single
A8003A	HP FC2242 PCI-e 4 GB HBA	4 GB	PCI-e	Dual
AE311A	HP FC1142 4 GB PCI-e HBA	4 GB	PCI-e	Single
AE312A	HP FC1242 4 GB PCI-e HBA	4 GB	PCI-e	Dual
AK344A	HP 81Q 8 GB PCI-e HBA	8 GB	PCI-e	Single

Designed for customers wishing to support their mission-critical business applications with reliable, high-performance, Fibre Channel connectivity, HP StorageWorks Fibre Channel host bus adapters (HBAs) provide a choice of leading options for compatibility in a host of operating environments.

OS platform	Array compatibility	Model/vendor	Server platform
Linux, Netware	MSA, EVA, XP	QLogic	See array quickspec: **www.hp.com/products/quickspecs**
Linux, Windows	MSA, EVA, XP	QLogic	See array quickspec: **www.hp.com/products/quickspecs**
Windows, Linux	MSA, EVA, XP	QLogic	ProLiant support
Windows, Linux	XP, EVA, MSA	Emulex	ProLiant support
Windows, Linux	MSA, EVA, XP	Emulex	ProLiant, Intel Itanium support
Windows, Linux	XP, EVA, MSA	QLogic	ProLiant support
Windows, Linux	XP, EVA, MSA	Emulex	ProLiant, Integrity support
Windows, Linux	XP, EVA, MSA	Emulex	ProLiant, Integrity support
Windows, Linux	XP, EVA, MSA	QLogic	ProLiant support
Windows, Linux	XP, EVA, MSA	QLogic	ProLiant support
Windows, Linux	EVA, MSA	QLogic	ProLiant support

Simply File Services

Small and medium-sized businesses feel the crunch caused by growing storage data volumes. Much of the storage growth is driven by unstructured files, such as rich media, productivity documents, and backup files.

A dedicated and optimized file-serving solution consolidates file storage to improve performance, simplify management, and increase efficiency. Networked storage is accessible to all computers that can access the network, making it easier to centrally scale, manage, and protect.

HP ProLiant Storage Servers are Windows-powered enhanced file-and-print server solutions for small or medium business, branch office, workgroup, or data center IT environments. These preloaded, preconfigured, and fully tested solutions take advantage of standard Ethernet-based networks to give you consolidated network-attached storage (NAS) for file-and-print serving.

Like most NAS solutions, they support heterogeneous files. They improve data access to clients and applications and provide network-accessible storage to a mix of clients and servers running different operating systems and file access protocols.

Choosing an HP ProLiant Storage Server will enable you to:

- Increase shared file storage capacity quickly and easily while reducing the time and personnel required to manage and protect data
- Consolidate the number of file-and-print servers to optimize capacity utilization and performance usage
- Integrate the solution seamlessly into Windows environments and run preferred backup or antivirus application right on the box
- Deploy a no-frills disk-based backup solution as an interim step or alternative to tape backup
- Achieve near-real-time full application or file recovery over an IP network, by combining it with HP StorageWorks Storage Mirroring software

For more information, visit: **www.hp.com/go/simplystorageworks**

HP ProLiant Storage Server family overview

With a full range of HP ProLiant Storage Servers, you can choose the level of performance and scalability you need to meet your specific file-serving requirements.

Rack line

Tower line

Enterprise

DL585 G2 Storage Server

Fibre Channel SAN/EVA gateways

DL380 G5 x64 SAN Storage Server

Departmental

DL380 G5 Storage Server

File/print appliances

DL320s Storage Server

ML350 G5 Storage Server

DL160 G5 Storage Server

Remote office

ML110 G5 Storage Server
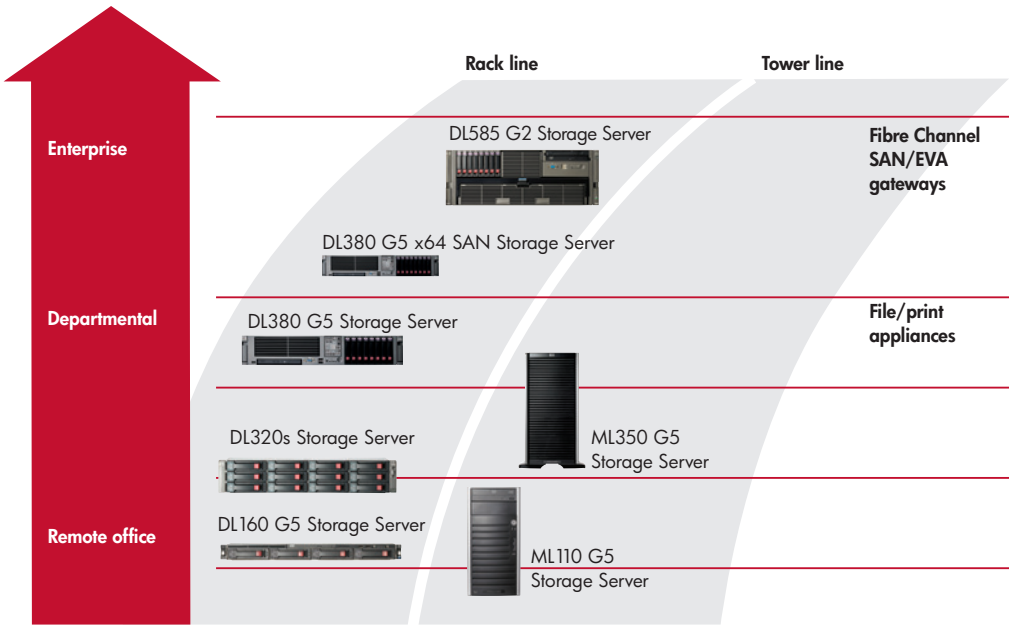
Want to combine file-and-print serving with application data hosting? Consider the HP StorageWorks All-in-One Storage Systems featured on pages 5–11.

HP ProLiant Storage Servers

Key features and benefits

- **Fast and easy to deploy:** The Windows-powered operating system is preinstalled and user storage is preconfigured, so it is a quick, secure, and easy way to add storage to your network or to add intelligent file and iSCSI services to your Fibre Channel SAN.

- **A single centralized file server platform to manage and protect:** Consolidate islands of direct-attached storage to one easy-to-use Windows platform or create a scalable disk-based backup or replication target.

- **Microsoft Windows-powered operating system preinstalled:** It integrates seamlessly into your Active Directory and Distributed File System (DFS) environments, runs your favourite antivirus or backup applications, and, if you have used Microsoft Management Console (MMC) before, will not present a steep learning curve.

- **Multiprotocol file serving:** You can deploy in wide range of heterogeneous file-serving environments with support for SMB/CIFS, NFS, HTTP, FTP, WebDAV, AppleTalk, and NetWare file protocols.

- **Add file access to your SAN or tier SAN block access:** Some models act as a file/iSCSI gateway into a Fibre Channel SAN, providing IP-based access to virtually unlimited storage.

- **Intelligent storage management features:** Make more efficient use of storage space using the file deduplicating Single-instance Storage (SIS) feature and the benefits of other storage-specific tools such as Index-based search, Microsoft SharePoint Services support, Quotas, File Screening, Storage Reporting, and DFS Replication.

- **Print server support:** The print management console is integrated into the core functionality of the operating system, allowing management of multiple printers from a single interface.

- **HP ProLiant industry-standard reliability:** You can relax because your investment is protected and you are not locked into proprietary hardware.

- **Microsoft iSCSI Software Target support:** Lower your total cost of ownership by hosting application (block) storage on your storage server. SAN gateway models featuring the Microsoft Windows Unified Data Storage Server 2003 Enterprise x64 Edition operating system include iSCSI target functionality, while other models can be upgraded with optional software.
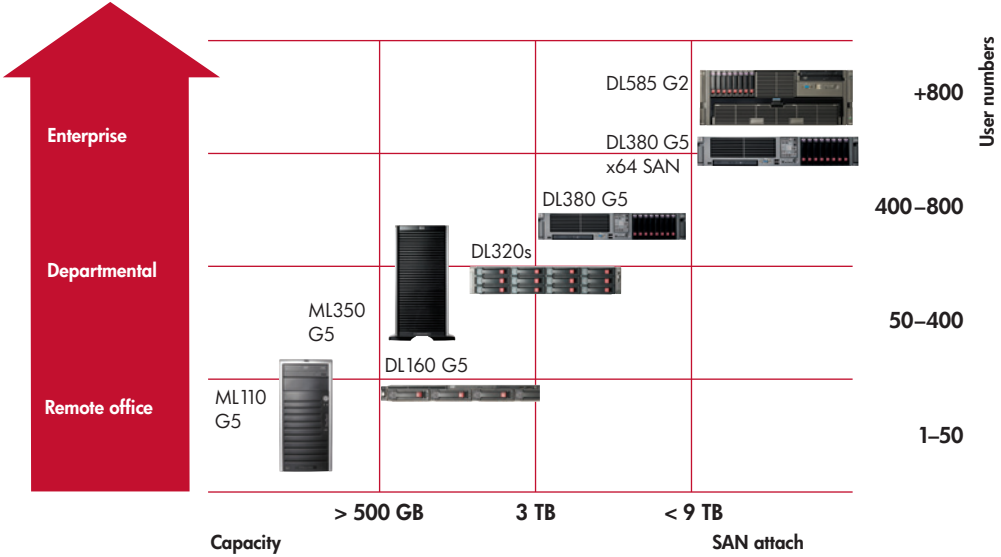
HP ProLiant ML110 G5 Storage Server

The HP ProLiant ML110 G5 Storage Server is an affordable single processor tower file-serving solution designed to provide a solid network storage foundation essential to small or remote businesses environments.

Key features and benefits

- **Entry-level tower platform:** the two-drive 320 GB SATA model sets a new standard for ProLiant Storage Server affordability, while four-drive SATA and SAS models deliver even more value with additional capacity and performance
- **Simplicity:** offers a consolidated, intuitive interface to basic storage server functionality that both novice and experienced administrators alike will appreciate

Ordering information

AK303A HP ProLiant ML110 G5 320 GB SATA Storage Server
AK308A HP ProLiant ML110 G5 1 TB SATA Storage Server
AK313A HP ProLiant ML110 G5 2 TB SATA Storage Server
AK318A HP ProLiant ML110 G5 584 GB SAS Storage Server

Technical specifications

Processor	Single-core Intel® Celeron® 420 1.6 GHz (320 GB SATA model) Dual-Core Intel® Pentium® E2160 1.8 GHz (1 TB SATA, 2 TB SATA, and 584 GB SAS models)
Memory (std./max.)	512 MB or 1 GB/8 GB
Operating system	Microsoft Windows Storage Server 2003 Release 2 (Workgroup x64 Edition— 320 GB SATA model) (Standard x64 Edition— 1 TB SATA, 2 TB SATA, and 584 GB SAS models)
Storage controller	None—Software RAID (320 GB SATA model) Smart Array E200 Controller with 128 MB BBWC (1 TB SATA, 2 TB SATA, and 584 GB SAS models)
Internal storage	Up to four internal LFF SATA or SAS HDDs preinstalled (2 x 160 GB SATA; 4 x 250 or 500 GB SATA or 146 GB SAS)
Network controller	Embedded NC105i PCIe Gigabit Ethernet Server Adapter
Form factor	Micro ATX tower

HP ProLiant DL160 G5 Storage Server

The HP ProLiant DL160 G5 Storage Server is an affordable space-saving rack-mount network storage solution for small workgroups, small businesses, or remote offices.

Key features and benefits

- **Industry-standard hardware:** the ProLiant DL160 platform with Smart Array controller is both affordable and powerful
- **Versatility for a wide range of deployments:** support for both SATA and SAS drives helps you balance capacity, performance, and reliability

Technical specifications

Processor	Quad-core Intel® Xeon® E5405 (2.00 GHz)
Memory (std./max.)	1 GB or 2 GB/32 GB
Operating system	Microsoft Windows Storage Server 2003 Release 2 (Standard x64 Edition)
Storage controller	Smart Array E200 Storage Controller with 128 MB BBWC included
Storage capacity	Four internal LFF SATA or SAS HDDs preinstalled (4 x 160, 250, 500, or 750 GB SATA or 300 GB SAS)
Network controller	Dual embedded NC105i PCI Express Gigabit Server Adapters
Form factor	1U rack

Ordering information

AJ672A HP ProLiant DL160 G5 640 GB SATA Storage Server
AJ673A HP ProLiant DL160 G5 1 TB SATA Storage Server
AJ674A HP ProLiant DL160 G5 2 TB SATA Storage Server
AJ675A HP ProLiant DL160 G5 3 TB SATA Storage Server
AJ676A HP ProLiant DL160 G5 1.2 TB SAS Storage Server

HP ProLiant ML350 G5 Storage Server

The HP ProLiant ML350 G5 Storage Server is a powerful tower file-serving solution with high-availability and performance features plus unsurpassed flexibility that is ideal for small and medium businesses.

Key features and benefits

- **High-capacity SATA-based and high-performance SAS-based models:** choose the model best suited to your performance, capacity, and price needs
- **Large-capacity expansion with external storage enclosures:** with a wide range of external storage enclosures that support SATA, SAS, SCSI, or Fibre Channel–based hard disk drives
- **Dual-core Intel Xeon processor technology:** dual-core processor provides excellent performance for the most demanding file-and-print serving requirements; add a second processor for even greater performance capability

Technical specifications

Processor	Dual-core Intel® Xeon® 5150 (2.67 GHz)
Memory (std./max.)	1 GB/4 GB
Operating system	Microsoft Windows Storage Server 2003, Release 2 (Standard Edition)
Storage controller	Smart Array E200i Controller with 128 MB BBWC included
Internal storage	Six internal 1.5G SATA or 3G SAS HDDs preinstalled (6 x 160, 250, 500 GB SATA, or 300 GB SAS)
Network controller	Embedded NC373i Multifunction Gigabit Network Adapter
Form factor	5U tower (Optional Rack Kit available)

Ordering information

AE420A HP ProLiant ML350 G5 960 GB SATA Storage Server
AE425A HP ProLiant ML350 G5 1.5 TB SATA Storage Server
AE430A HP ProLiant ML350 G5 3 TB SATA Storage Server
AG587A HP ProLiant ML350 G5 1.8 TB SAS Storage Server

HP ProLiant DL320s Storage Server

The HP ProLiant DL320s Storage Server is a highly integrated and high-density file-serving solution with enterprise-level features at an affordable price for remote office and departmental environments.

Key features and benefits

- **High-density storage on a highly integrated platform:** packs all the storage (with 12 drive slots, the DL320s Storage Server supports up to 9 TB raw) and I/O you need into only 2U of rack space
- **High-capacity SATA-based and high-performance SAS-based models:** choose the model that best balances your performance, capacity, and affordability needs

Technical specifications

Processor	Dual-core Intel® Xeon® 3070 (2.67 GHz)
Memory (std./max.)	1 GB/4 GB
Operating system	Microsoft Windows Storage Server 2003 Release 2 (Standard Edition)
Storage controller	Smart Array P400/512 MB Controller (RAID 0, 1, 5, 6) with BBWC
Internal storage	Twelve 3.5" LFF SATA or SAS hard drives, internal storage capacity of up to 9 TB (12 x 750 GB SATA hard drives)
Network controller	Embedded NC324i PCIe Dual-port Gigabit Server Adapter
Form factor	2U rack

Ordering information

AG650A HP ProLiant DL320s 3 TB SATA Storage Server

AG651A HP ProLiant DL320s 6 TB SATA Storage Server

AG652A HP ProLiant DL320s 9 TB SATA Storage Server

AG653A HP ProLiant DL320s 1.7 TB SAS Storage Server

AG654A HP ProLiant DL320s 3.6 TB SAS Storage Server

HP ProLiant DL380 G5 Storage Server

HP ProLiant DL380 G5 Storage Servers are high-performance network storage appliances—and can also be used in addition to a SAN/EVA gateway solution—for workgroup and enterprise environments.

Key features and benefits

- **Flexible:** A DL380 Storage Server comes as either a file server appliance with its own direct-attached storage or as a SAN/EVA gateway solution that adds services to your Fibre Channel SAN.
- **Scalable to large capacities:** File appliance models are designed for easy expansion with HP StorageWorks MSA enclosures and either SAS or SATA hard disk drives. Four models even include an MSA60 and either six or 12 hard drives to get you started.
- **Additional file access for SAN or tier SAN block access:** The new x64 SAN Storage Server model is a file and iSCSI gateway into a Fibre Channel SAN, providing IP-based access to virtually unlimited SAN storage.

Ordering information

AG815A HP ProLiant DL380 G5 Base Storage Server
AG816A HP ProLiant DL380 G5 1.16 TB SAS
AG817A HP ProLiant DL380 G5 4.5 TB SATA Storage Server
AG818A HP ProLiant DL380 G5 9 TB SATA Storage Server
AG819A HP ProLiant DL380 G5 1.8 TB SAS Storage Server
AG820A HP ProLiant DL380 G5 3.6 TB SAS Storage Server
AG771A HP ProLiant DL380 G5 x64 SAN Storage Server

Technical specifications

Processor	Up to two quad-core Intel® Xeon® E5345 2.33 GHz
Memory (std./max.)	2 GB/32 GB on base, 1.2 TB SCSI, 2 TB SATA, and 1.16 TB SAS models (all models except x64 SAN model); 4 GB/32 GB on x64 SAN model
Operating system	Microsoft Windows Storage Server 2003 Release 2 (Standard x64 Edition)—all models except x64 SAN model
Microsoft Windows Unified Data Storage Server 2003 (Enterprise x64 Edition) for x64 SAN model
Storage controller	Smart Array P400 with 512 MB BBWC for internal drives Smart Array 6402 with 128 MB BBWC for external drives (1.2 TB SCSI and 2 TB SATA models only) Smart Array P800/512 MB (all models except x64 SAN model); Smart Array P400/512 MB (x64 SAN model)
Internal storage	Two 36 GB SAS HDDs—all models except 1.16 TB SAS model (8 x 146 GB)
Network controller	Embedded Dual NC373i Multifunction Gigabit NICs
Form factor	2U rack (Storage Server only)

HP ProLiant DL585 G2 Storage Server

The HP ProLiant DL585 G2 Storage Server is a powerful and highly expandable SAN/EVA gateway solution that is ideal for mission-critical data center file-serving and tiered SAN (Fibre Channel and iSCSI) environments.

Key features and benefits

- **Unified storage operating system:** The DL585 G2 Storage Server comes with Microsoft Windows Unified Data Storage Server 2003, a dedicated file-and-print server operating system with iSCSI connectivity and clustering capability built in. It is all based on the proven Windows Storage Server 2003 R2 code base and takes advantage of its superior security, stability, performance, and management features.
- **SAN/file/iSCSI fusion:** Designed for use as a file-serving and/or iSCSI gateway into a Fibre Channel SAN, providing IP-based access to virtually unlimited storage. It can facilitate consolidation of islands of direct-attached storage to the SAN, as well as help tier block storage for application servers by creating access to the SAN via inexpensive Ethernet infrastructure.
- **High performance, reliable, and expandable:** Supports up to four processors, up to 128 GB of memory, eight available I/O expansion slots, multifunction gigabit NICs, Hardware RAID, and redundant power and cooling.

Technical specifications

Processor	Two Dual-Core AMD Opteron™ 8220SE 2.8 GHz
Memory (std./max.)	4 GB/128 GB
Operating system	Microsoft Windows Unified Data Storage Server 2003 (Enterprise x64 Edition)
Storage controller	HP Smart Array P400 with 512 MB of BBWC (in a PCI Express slot)
Internal storage	Two 36 GB 10k SFF SAS HDDs
Network controller	Embedded dual NC371i multifunction gigabit network adapters
Form factor	4U rack

Ordering information

AG630A HP ProLiant DL585 G2 Storage Server

HP StorageWorks All-in-One Storage Systems as a file-serving solution

HP StorageWorks All-in-One (AiO) Storage Systems are radically simple, integrated, and affordable network storage solutions that enable small and midsized companies to manage, grow, and protect their data easily.

The HP StorageWorks AiO400t, AiO400r, AiO600, AiO SB600c, and new AiO1200 Storage Systems provide shared storage expansion for application servers (iSCSI SAN), enhanced file serving for end-user clients (Windows NAS), and comprehensive data protection. These fully integrated solutions are designed to be deployed on the existing TCP/IP network or subnet and provide everything you need to lower the cost and complexity associated with rapidly growing data environments.

All-in-One Storage Manager
A single interface to manage storage and data protection from an application-centric point of view.
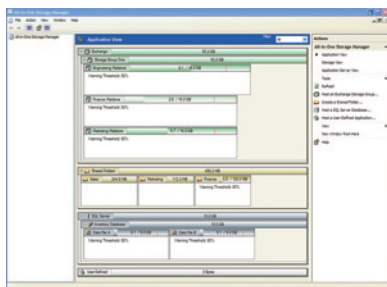
Set-up and migration tools
IT generalists can set up storage quickly and easily and migrate data using "best-practice" wizards.
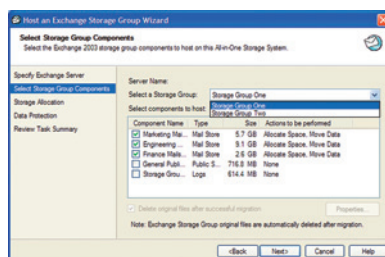
For full product overview go to pages 6 – 11 of this guide or to:
www.hp.com/go/AiOstorage

Simply Business Protection

Reliable data protection is one of the most important challenges that businesses face today. To help ensure data availability in the event of any threat, it is essential to have the appropriate data protection and recovery strategy in place.

With Simply Business Protection, HP makes it easy to choose the right strategy. We offer simple and reliable solutions for every need—from instant recovery of business-critical data to the complete protection afforded by media held offsite—all backed by comprehensive support for lasting peace of mind:

- **HP StorageWorks DAT tape drives:** for low-cost, high-reliability backup of small servers and workstations
- **HP StorageWorks Ultrium tape drives:** the best choice for investment protection, in a choice of full- and half-height models
- **HP StorageWorks tape autoloaders:** for unattended backup that frees up IT resources and minimizes the risk of human error
- **HP StorageWorks MSL tape libraries:** for centralized backup to a single automated device
- **HP Storage Media:** tested and certified for all StorageWorks drives and automation solutions
- **HP StorageWorks disk-based backup solutions:** disk-based iSCSI-connected solution for unattended backup and improved restore performance
- **HP Data Protection Storage Servers:** near-continuous protection for Windows file servers that allows end users to restore their own files
- **HP Storage Software:** customized software solutions protecting infrastructure and data

For more information, visit: **www.hp.com/go/simplystorageworks**

HP StorageWorks tape drives, autoloaders, and libraries

HP meets customer needs for tape backup, from small and medium-sized businesses to enterprise corporations.

Tape drives

Tape autoloaders and libraries

Corporate/
networked
backup

Ultrium 1840

Ultrium 1760

Ultrium 960

MSL8096

MSL6060

Departmental/
local network

Ultrium 920

SB920c
Tape Blade

MSL4048

Ultrium 448

Ultrium 448c
Tape Blade

MSL6030

Office servers

Ultrium 232

MSL2024

DAT 160

1/8 G2
Autoloader

DAT 72

Workstations

DAT 40

DAT 72x10
Autoloader
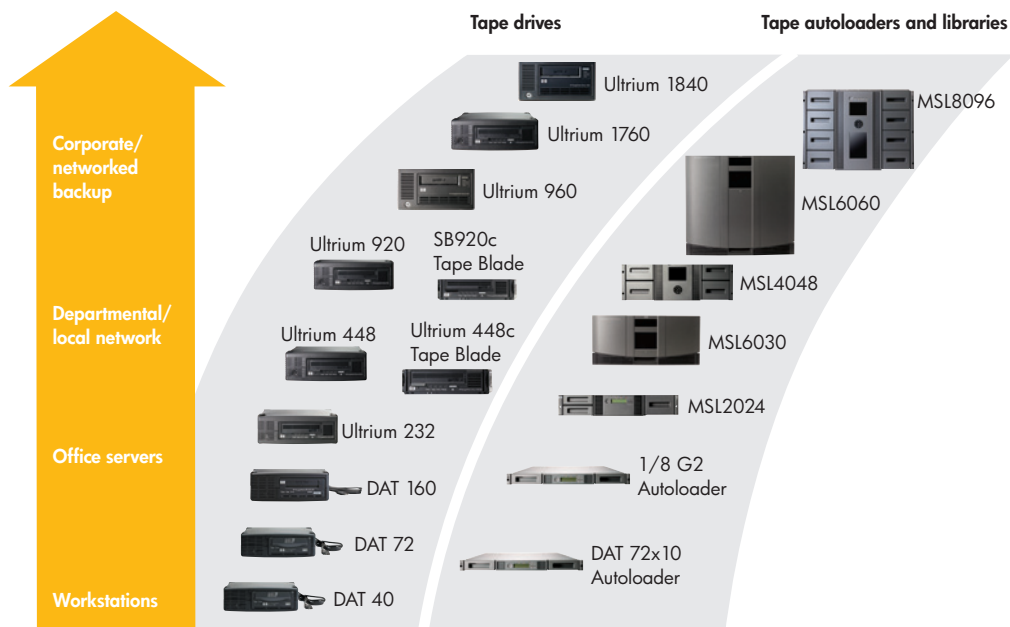
All HP StorageWorks tape drives, autoloaders, and libraries come complete with an in-box CD containing an electronic user guide, drivers, and HP StorageWorks Library and Tape Tools diagnostic utilities.

For more information about products and connectivity, refer to: **www.hp.com/go/tape** and **www.hp.com/go/connect**

HP StorageWorks DAT
tape drive family

The HP StorageWorks DAT tape drive family provides the perfect balance between low cost and high reliability for backing up small servers and workstations.

HP StorageWorks DAT drives are based on Digital Data Storage (DDS) format, the most successful tape backup format of all time. DDS technology has led the tape market for so many years because it meets the needs of small and medium-sized businesses for reliable, cost-effective data protection better than any other technology. HP's long experience in developing DAT drives provides customers with a proven track record of reliability.

HP StorageWorks DAT family positioning

Office or department servers

Individual workstations

Capacity (compressed*)

200 GB

DAT 160

DAT 72

50 GB

DAT 40

25 GB

Speed GB/hr (compressed*)

6 12 25 50
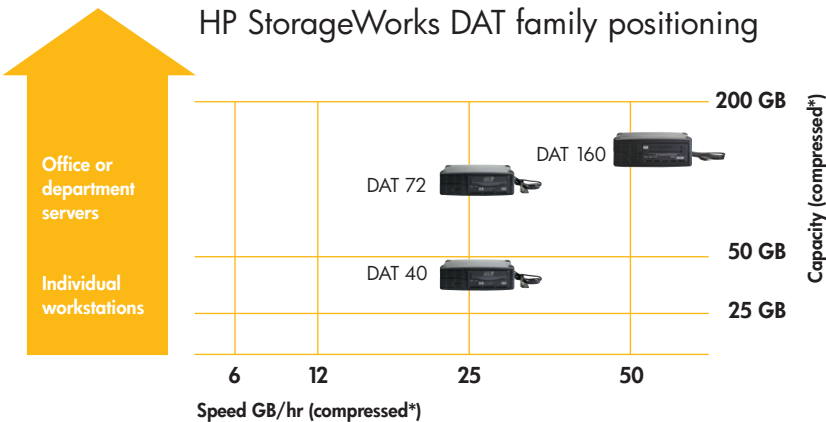
	DAT 40	DAT 72	DAT 160
Generation	Gen 4 (DDS-4)	Gen 5	Gen 6
Capacity (compressed*)	40 GB	72 GB	160 GB
Transfer rate (GB/hr compressed*)	21.6 GB/hr	21.6 GB/hr	49.3 GB/hr
Interface	USB or SCSI	USB or SCSI	USB, SCSI, or SAS

* Assumes 2:1 data compression

HP StorageWorks DAT 40 SCSI and DAT 40 USB Tape Drives

These tape drives provide dependable entry-level backup solutions for smaller servers and workstations—an ideal balance between cost and performance. Choose between SCSI or USB interface.

DAT 40 SCSI Tape Drive

DAT 40 USB Tape Drive

Key features and benefits

- **Entry-level capacity:** up to 40 GB* of data on a single tape
- **Performance:** transfer rate up to 21.6 GB/hr*
- **Proven reliability:** DAT has a long track record of reliability and the largest installed base of any tape technology
- **Low cost of ownership:** lowest media price of any tape technology
- **Investment protection:** full read/write compatibility with DDS/DAT drives and media from HP and other manufacturers
- **Simplicity:** HP OBDR restores your entire system at the touch of a button
- **Compact:** small, half-height form factor
- **Broad compatibility:** with a wide range of servers, operating systems, and backup software
- **Manageability:** HP StorageWorks Library and Tape Tools utilities
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools

Technical specifications

Capacity	Native	20 GB
	Compressed*	40 GB
Performance	Native	3.2 MB/s
	Compressed*	6.4 MB/s
	Burst Transfer	
	Rate	40 MB/s
Interface	DAT 40 SCSI: Wide Ultra SCSI (LVD/SE)	
	DAT 40 USB: USB 2.0 Series B receptacle	
Reliability	125,000 hours at 100% duty cycle	
Media compatibility	DDS-4 DDS-3 DDS-2	
Dimensions (HxWxD in.)	SCSI version: Internal: 1.6 x 5.7 x 6.1 External: 2.2 x 7.1 x 8.7	
	USB version: External: 2.2 x 7.1 x 8.7	
Weight	SCSI version: Internal: 2.1 lb External: 4.2 lb	
	USB version: External: 4.2 lb	

Ordering information

HP StorageWorks DAT 40 SCSI Tape Drive
C5686C DAT 40 Internal SCSI
C5687D DAT 40 External SCSI
C7497C DAT 40 SCSI Array Module
HP StorageWorks DAT 40 USB Tape Drive
DW022A DAT 40 Internal USB
DW023A DAT 40 External USB

*Assumes 2:1 data compression

HP StorageWorks DAT 72 SCSI and DAT 72 USB Tape Drives

These tape drives provide the optimum balance of dependable backup capacity and low cost of ownership for small and medium-sized businesses, remote offices, and workgroups. Choose between SCSI or USB interface.

DAT 72 SCSI Tape Drive

DAT 72 USB Tape Drive

Key features and benefits

- **Entry-level capacity:** up to 72 GB* of data on a single tape
- **Performance:** transfer rate up to 21.6 GB/hr*
- **Proven reliability:** DAT has a long track record of reliability and the largest installed base of any tape technology
- **Low cost of ownership:** lowest media price of any tape technology
- **Investment protection:** full read/write compatibility with DDS/DAT drives and media from HP and other manufacturers
- **Simplicity:** HP OBDR and the Data Protector Express Bare Metal Disaster Recovery option restore your entire system at the touch of a button
- **Compact:** small, half-height form factor
- **Broad compatibility:** with a wide range of servers, operating systems, and backup software
- **Manageability:** HP StorageWorks Library and Tape Tools utilities
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools

Ordering information

HP StorageWorks DAT 72 SCSI Tape Drive
Q1522B DAT 72 Internal SCSI
Q1523B DAT 72 External SCSI
Q1524C DAT 72 SCSI Array Module
HP StorageWorks DAT 72 USB Tape Drive
DW026A DAT 72 Internal USB
DW027A DAT 72 External USB

Technical specifications

Capacity	Native	36 GB
	Compressed*	72 GB
Performance	Native	3.2 MB/s
	Compressed*	6.4 MB/s
	Burst Transfer Rate	40 MB/s
Interface	DAT 72 SCSI: SCSI-3 Ultra160	
	DAT 72 USB: USB 2.0 Series B receptacle	
Reliability	125,000 hours at 100% duty cycle	
Media compatibility	DAT 72 DDS-4 DDS-3)	
Dimensions (HxWxD in.)	SCSI version: Internal: 1.6 x 5.7 x 6.1 External: 2.2 x 7.1 x 8.7	
	USB version: External: 2.2 x 7.1 x 8.7	
Weight	SCSI version: Internal: 2.1 lb External: 4.2 lb	
	USB version: External: 4.2 lb	

*Assumes 2:1 data compression

HP StorageWorks DAT 160 SCSI, USB, and SAS Tape Drives

These are the highest-capacity and performance DAT drives available with speeds of around 50 GB/hr to complete a full tape backup in approximately three hours. Choose between SCSI, USB, or SAS interface.

DAT 160 SCSI Tape Drive

DAT 160 USB Tape Drive

DAT 160 SAS Tape Drive

Key features and benefits

- **Entry-level capacity:** up to 160 GB* of data on a single tape
- **Performance:** transfer rate up to 50 GB/hr*
- **Proven reliability:** DAT has a long track record of reliability and the largest installed base of any tape technology
- **Low cost of ownership:** lowest media price of any tape technology
- **Investment protection:** full read/write compatibility with DDS/DAT drives and media from HP and other manufacturers
- **Simplicity:** HP OBDR and the Data Protector Express Bare Metal Disaster Recovery option restore your entire system at the touch of a button
- **Compact:** small, half-height form factor
- **Broad compatibility:** with a wide range of servers, operating systems, and backup software
- **Manageability:** HP StorageWorks Library and Tape Tools utilities
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option. and HP StorageWorks Library and Tape Tools

Technical specifications

Capacity	Native	80 GB
	Compressed*	160 GB
Performance	Native	6.9 MB/s
	Compressed*	13.8 MB/s
	Burst Transfer Rate	6.9 MB/s
Interface	DAT 160 SCSI: SCSI-3 Ultra 160 DAT 160 USB: USB 2.0 DAT 160 SAS: SAS 1.1	
Reliability	125,000 hours at 100% duty cycle	
Media compatibility	DAT 160 DAT 72 DAT 40	
Dimensions (HxWxD in.)	Internal (SAS and USB): 1.6 x 5.7 x 7.2 Internal (SCSI): 1.6 x 5.7 x 7.0 External (all): 2.6 x 7.1 x 9.3	
Weight	Internal (all): 2.7 lb External (all): 5 lb	

*Assumes 2:1 data compression

HP StorageWorks Ultrium tape family

HP's premier line of backup devices is available in full-height and half-height drives. Based on the LTO Ultrium format, an open standard with a well-defined six-generation roadmap, HP Ultrium tape drives provide customers with the best choice for investment protection.

HP StorageWorks Ultrium family positioning
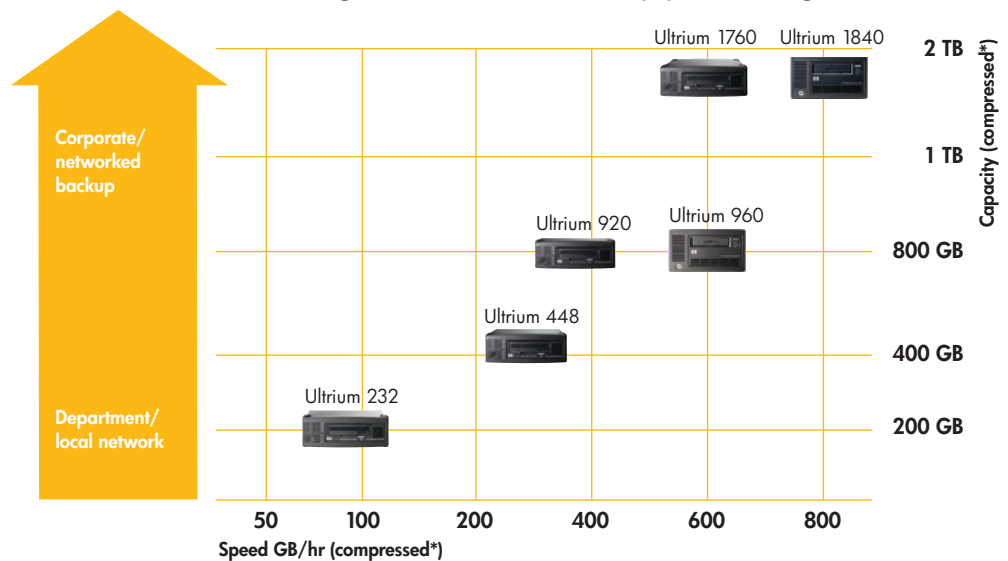
	Ultrium 232	Ultrium 448	Ultrium 920	Ultrium 960	Ultrium 1760	Ultrium 1840
Generation	Gen 1	Gen 2	Gen 3	Gen 3	Gen 4	Gen 4
Capacity (compressed*)	200 GB	400 GB	800 GB	800 GB	1.6 TB	1.6 TB
Transfer rate (GB/hr (compressed*)	115 GB/hr	172 GB/hr	432 GB/hr	576 GB/hr	576 GB/hr	864 GB/hr
Form factor	Half-height	Half-height	Half-height	Full-height	Half-height	Full-height
Interface	SCSI	SCSI and SAS	SCSI and SAS	SCSI	SAS	SCSI and SAS

* Assumes 2:1 data compression

HP StorageWorks Ultrium 232 Tape Drive

This affordable first-generation LTO superdrive delivers enterprise-class backup capacity, performance, and reliability at a midrange price.

HP StorageWorks Ultrium 232 Internal Tape Drive

HP StorageWorks Ultrium 232 External Tape Drive

Key features and benefits

- **Affordable capacity:** up to 200 GB* on a single cartridge
- **High performance:** transfer rate of 115 GB/hr*
- **Compact:** half-height form factor taking up less space in rack environments
- **Enterprise-class reliability:** with active head cleaning, lower power consumption, and intelligent tape handling
- **Simplicity:** HP OBDR and the Data Protector Express Bare Metal Disaster Recovery option restore your entire system at the touch of a button
- **Investment protection:** full read/write compatibility with Ultrium drives and media from HP and other manufacturers
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools
- **Data rate matching:** enables the drive to dynamically match the transfer rate to the speed of the host for enhanced performance and reliability

Technical specifications

Capacity	Native	100 GB
	Compressed*	200 GB
Performance	Native	16 MB/s
	Compressed*	32 MB/s
	Burst Transfer Rate	160 MB/s
Interface	Wide Ultra2 SCSI (LVD)	
Reliability	> 250,000 at 100% duty cycle	
Media compatibility	LTO1 Ultrium	
Dimensions (HxWxD in.)	Internal: 1.6 5.7 x 8.1 External: 3.0 x 8.8 x 11.7	
Weight	Internal: 3.2 lb External: 10.3 lb	

Ordering information

DW064A Ultrium 232 Internal
DW065B Ultrium 232 External

* Assumes 2:1 data compression

HP StorageWorks Ultrium 448 Tape Drive

Based on second-generation LTO technology, the half-height Ultrium 448 provides an affordable backup solution for SAS- or SCSI-based departmental servers.

HP StorageWorks Ultrium 448 Internal Tape Drive

HP StorageWorks Ultrium 448 External Tape Drive

Key features and benefits

- **Affordable capacity:** up to 400 GB* on a single cartridge
- **High performance:** transfer rate of 172 GB/hr*
- **Compact:** half-height form factor takes up less space in rack environments
- **Enterprise-class reliability:** with active head cleaning, lower power consumption, and intelligent tape handling
- **Simplicity:** HP OBDR and the Data Protector Express Bare Metal Disaster Recovery option restore your entire system at the touch of a button
- **Investment protection:** full read/write compatibility with Ultrium drives and media from HP and other manufacturers
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools
- **Data rate matching:** enables the drive to dynamically match the transfer rate to the speed of the host for enhanced performance and reliability

Technical specifications

Capacity	Native	200 GB
	Compressed*	400 GB
Performance	Native	24 MB/s
	Compressed*	48 MB/s
	Burst Transfer	
	Rate	160 MB/s
Interface	Ultra 160 SCSI (LVD) 3 Gb/s SAS	
Reliability	> 250,000 at 100% duty cycle	
Media compatibility	LTO2, LTO1 Ultrium	
Dimensions (HxWxD in.)	Internal: 1.6 x 5.7 x 8.1 External: 3.0 x 8.8 x 11. 7	
Weight	Internal: 3.2 lb External: 10.3 lb	

Ordering information

DW016A Ultrium 448 SCSI Internal
DW017B Ultrium 448 SCSI External
DW019A Ultrium 448 SCSI Array Module
DW028B Ultrium 448 SCSI in a 1U Rack-mount
DW085A Ultrium 448 SAS Internal
DW086A Ultrium 448 SAS External

* Assumes 2:1 data compression

HP StorageWorks Ultrium Tape Blades

HP StorageWorks Ultrium Tape Blades deliver an internal tape backup solution for HP BladeSystem c-Class customers not connected to a SAN.

HP StorageWorks Ultrium 448c Tape Blade

HP StorageWorks Ultrium SB920c Tape Blade

Key features and benefits

- **Integrated data protection solution:** by integrating within the BladeSystem c-Class enclosure, a complete server, storage, and data protection solution is achieved
- **Versatility:** provides direct-attached data protection of adjacent server, as well as network backup of all other data within the BladeSystem c-Class enclosure
- **Investment protection:** full read/write compatibility with Ultrium drives and media from HP and other manufacturers
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the HP Data Protector Express Bare Metal Disaster Recovery option and HP StorageWorks Library and Tape Tools to help with installation, management, and troubleshooting
- **Data rate matching:** enables the drive to dynamically match the transfer rate to the speed of the host for enhanced performance and reliability

Technical specifications

	Ultrium 448c Tape Blade	SB920c Tape Blade
Capacity	Native 200 GB Compressed* 400 GB	Native 400 GB Compressed* 800 GB
Performance	Native 24 MB/s Compressed* 48 MB/s Burst Transfer Rate 300 MB/s	Native 60 MB/s Compressed* 120 MB/s Burst Transfer Rate 300 MB/s
Interface	3 Gb/s SAS	3 Gb/s SAS
Form factor	Half-height BladeSystem c-Class	Half-height BladeSystem c-Class
Reliability	> 250,000 at 100% duty cycle	> 250,000 at 100% duty cycle
Media compatibility	LTO2, LTO1 Ultrium (read/write)	LTO3, LTO2 Ultrium (read/write) LTO1 Ultrium (read-only)
Dimensions (HxWxD in.)	2.19 x 7.15 x 20.1	2.19 x 7.15 x 20.1
Weight	11 lb	11 lb

Ordering information

440947-B21 HP StorageWorks Ultrium 448c Tape Blade

AJ401A SB920c Tape Blade

* Assumes 2:1 data compression

HP StorageWorks Ultrium 920 Tape Drive

Based on third-generation LTO technology, the half-height Ultrium 920 provides enterprise customers with a high density tape backup solution at a midrange price.

HP StorageWorks Ultrium 920 Internal Tape Drive

HP StorageWorks Ultrium 920 External Tape Drive

Key features and benefits

- **Maximum capacity:** up to 800 GB* on a single cartridge
- **High performance:** transfer rate of 576 GB/hr*
- **Write Once, Read Many (WORM):** the Ultrium Generation 3 WORM data protection feature provides a simple and secure method of archiving records as part of a compliance solution, to meet the toughest of industry regulations
- **Enterprise-class reliability:** with active head cleaning, lower power consumption, and intelligent tape handling
- **Simplicity:** HP OBDR and the Data Protector Express Bare Metal Disaster Recovery option restore your entire system at the touch of a button
- **Investment protection:** full read/write compatibility with LTO2 and LTO3 media as well as read support for LTO1 media
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools
- **Data rate matching:** enables the drive to dynamically match the transfer rate to the speed of the host for enhanced performance and reliability

Technical specifications

Capacity	Native	400 GB
	Compressed*	800 GB
Performance	Native	60 MB/s
	Compressed*	120 MB/s
	Burst Transfer	
	Rate	320 MB/s
Interface	Wide Ultra320 SCSI (LVDS) 3 Gb/s SAS	
Reliability	> 250,000 at 100% duty cycle	
Media compatibility	LTO3, LTO2 Ultrium LTO3 Ultrium WORM LTO1 Utlrium (read-only)	
Dimensions (HxWxD in.)	Internal: 1.6 x 5.7 x 8.1 External: 3.0 x 8.8 x 11.7	
Weight	Internal: 3.2 lb External: 10.3 lb	

Ordering information

EH841A Ultrium 920 SCSI Internal
EH842A Ultrium 920 SCSI External
EH903A Ultrium 920 SCSI in a 1U Rack-mount
EH847A Ultrium 920 SAS Internal
EH848A Ultrium 920 SAS External

* Assumes 2:1 data compression

HP StorageWorks Ultrium 960 Tape Drive

The HP StorageWorks Ultrium 960 Tape Drive is a third-generation drive in the HP Ultrium tape drive family, providing a fast-performing, high-capacity backup solution and compatibility with LTO1 and LTO2 media.

Key features and benefits

- **Maximum capacity:** up to 800 GB* on a single cartridge
- **High performance:** transfer rate of 576 GB/hr*
- **Write Once, Read Many (WORM):** the Ultrium Generation 3 WORM data protection feature provides a simple and secure method of archiving records as part of a compliance solution, to meet the toughest of industry regulations
- **Enterprise-class reliability:** with active head cleaning, lower power consumption, and intelligent tape handling
- **Simplicity:** HP OBDR and the Data Protector Express Bare Metal Disaster Recovery option restore your entire system at the touch of a button
- **Investment protection:** full read/write compatibility with Ultrium 1 and 2 drives and media from HP and other manufacturers
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools
- **Data rate matching:** enables the drive to dynamically match the transfer rate to the speed of the host for enhanced performance and reliability

HP StorageWorks Ultrium 960 Internal Tape Drive

HP StorageWorks Ultrium 960 External Tape Drive

Technical specifications

Capacity	Native	400 GB
	Compressed*	800 GB
Performance	Native	80 MB/s
	Compressed*	160 MB/s
	Burst Transfer	
	Rate	320 MB/s
Interface	Wide Ultra320 SCSI (LVDS)	
Reliability	> 250,000 at 100% duty cycle	
Media compatibility	LTO3, LTO2 Ultrium LTO3 Ultrium WORM LTO1 Ultrium (read-only)	
Dimensions (HxWxD in.)	Internal: 3.3 x 5.7 x 8.2 External: 4.7 x 8.6 x 11.7	
Weight	Internal: 4.9 lb External: 12.3 lb	

Ordering information

Q1538A Ultrium 960 Internal
Q1539B Ultrium 960 External
Q1540A Ultrium 960 Array Module
Q1595A Ultrium 960 in a 3U Rack-mount

* Assumes 2:1 data compression

HP StorageWorks LTO4 Ultrium 1760 Tape Drive

The HP StorageWorks LTO4 Ultrium 1760 Tape Drive delivers a compressed storage capacity of 1.6 TB and a compressed data transfer rate of 576 GB/hour while providing hardware data encryption to deliver the ultimate data protection for entry-level and midsized customers.

HP StorageWorks LTO4 Ultrium 1760 Internal Tape Drive

HP StorageWorks LTO4 Ultrium 1760 External Tape Drive

Key features and benefits

- **High capacity:** stores up to 1.6 TB of data on a single data cartridge using 2:1 compression. High-capacity drive reduces the costs associated with data protection by requiring fewer data cartridges to complete backups.

- **Higher performance with dynamic data rate matching:** provides a compressed data transfer rate of 576 GB/hr, allowing customers to scale their backup capacities without having to increase their backup windows. HP's exclusive dynamic data rate matching feature can match the throughput of the host and reduce starting and stopping the tape drive.

- **Half-height form factor for easy installation and integration:** allows for installation into all standard 5.25-inch media bays.

- **AES 256-bit hardware data encryption:** provides easy-to-enable security to protect the most sensitive data and prevent unauthorized access of tape cartridges.

- **Management and diagnostics software included:** Tape drive management, performance optimization, and troubleshooting are made simple using the HP StorageWorks Library and Tape Tools application that is included with the HP Ultrium 1760 Tape Drive.

- **WORM (Write-Once, Read-Many) media support:** For IT organizations with stringent, long-term data retention requirements, LTO4 WORM provides a simple and secure method for archiving records that allows customers to affordably meet the toughest industry compliance regulations.

Technical specifications

Capacity	Native	800 GB
	Compressed*	1.6 TB
Performance	Native	80 MB/s
	Compressed*	160 MB/s
	Burst Transfer Rate	300 MB/s
Interface	3 Gb/s SAS	
Reliability	> 250,000 at 100% duty cycle	
Media compatibility	LTO4, LTO3 Ultrium LTO4, LTO3 Ultrium WORM LTO2 Ultrium (read-only) Only LTO4 Ultrium media can be encrypted.	
Dimensions (HxWxD in.)	Internal: 1.6 x 5.7 x 8.1 External: 3.0 x 8.8 x 11.7	
Weight	Internal: 3.2 lb External: 10.3 lb	

Ordering information

EH919A Ultrium 1760 SAS Internal
EH920A Ultrium 1760 SAS External
EH946A Ultrium 1760 SAS in a 1U Rack-mount

* Assumes 2:1 data compression

HP StorageWorks LTO4 Ultrium 1840 Tape Drive

The HP StorageWorks LTO4 Ultrium 1840 Tape Drive represents HP's fourth-generation of LTO tape drive technology, which is capable of storing up to 1.6 TB per cartridge while providing hardware-based data encryption to enable greater levels of security and unprecedented performance.

Key features and benefits
- **Maximum capacity:** up to 1.6 TB* on a single cartridge
- **High performance:** transfer rate of 864 GB/hr*
- **AES 256-bit hardware data encryption:** provides easy-to-enable security to protect the most sensitive data and prevent unauthorized access of tape cartridges.
- **Write Once, Read Many (WORM):** support for LTO4 WORM media provides a simple and secure method of archiving records as part of a compliance solution, to meet the toughest of industry regulations
- **Enterprise-class reliability:** with active head cleaning, lower power consumption, and intelligent tape handling
- **Simplicity:** HP OBDR and the Data Protector Express Bare Metal Disaster Recovery option restore your entire system at the touch of a button
- **Investment protection:** read/write compatibility with LTO3 media and read compatibility with LTO2 media
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools
- **Data rate matching:** enables the drive to dynamically match the transfer rate to the speed of the host for enhanced performance and reliability

Ordering information

EH853A Ultrium 1840 SCSI Internal

EH854A Ultrium 1840 SCSI External

EH856A Ultrium 1840 SCSI Array Module

EH926A Ultrium 1840 SCSI in a 3U Rack-mount

EH860A Ultrium 1840 SAS Internal

EH861A Ultrium 1840 SAS External

HP StorageWorks LTO4 Ultrium 1840 Internal Tape Drive

HP StorageWorks LTO4 Ultrium 1840 External Tape Drive

Technical specifications

Capacity	Native	800 GB
	Compressed*	1.6 TB
Performance	Native	120 MB/s
	Compressed*	240 MB/s
	Burst Transfer Rate	240 MB/s
Interface	Wide Ultra320 SCSI (LVDS) 3 Gb/s SAS	
Reliability	> 250,000 at 100% duty cycle	
Media compatibility	LTO3 Ultrium LTO4, LTO3 Ultrium WORM LTO4 UltriumB LTO2 Ultrium (read-only) Only LTO4 Ultrium media can be encrypted.	
Dimensions (HxWxD in.)	Internal: 3.3 x 5.7 x 8.2 External: 4.7 x 8.6 x 11.7	
Weight	Internal: 4.9 lb External: 12.8 lb	

* Assumes 2:1 data compression

HP StorageWorks rack-mount and tape-array solutions

Rack-mount and tape-array solutions are both designed to provide a modular enclosure for direct-attached SCSI, USB, and SAS backup and archiving applications.

HP StorageWorks Rack-Mount Kits

HP rack-mount enclosures allow customers to expand and migrate between different capacity points or drive technologies as required.

Rack-mount enclosures (one drive installed)

1U	HP StorageWorks USB Rack-Mount Kit with one DAT 72 drive installed	AG594A
1U	HP StorageWorks USB Rack-Mount Kit with one DAT 160 drive installed	AG703A
1U	HP StorageWorks Rack-Mount Kit with one Ultrium 448 SCSI drive installed	DW028B
1U	HP StorageWorks Rack-Mount Kit with one Ultrium 920 SCSI drive installed	EH903A
3U	HP StorageWorks Rack-Mount Kit with one Ultrium 960 SCSI drive installed	Q1595B
1U	HP StorageWorks Rack-Mount Kit with one Ultrium 1760 SAS drive installed	EH946A
3U	HP StorageWorks Rack-Mount Kit with one Ultrium 1840 SCSI drive installed	EH926A

Rack-mount enclosures (no drive installed)

1U	HP StorageWorks Rack-Mount Kit: holds 2 half-height SCSI drives	A7445B
1U	HP StorageWorks Rack-Mount Kit: holds 2 half-height USB drives	A8007A
1U	HP StorageWorks Rack-Mount Kit: holds 2 half-height Ultrium SAS drives	AE459A
3U	HP StorageWorks Rack-Mount Kit: holds 4 half-height or 2 full-height SCSI drives	274338-B22
3U	HP StorageWorks Rack-Mount Kit: holds 2 full-height or 4 half-height Ultrium SAS drives	AG576A

HP StorageWorks Tape Array 5300

HP StorageWorks Tape Array 5300	C7508B
HP StorageWorks Tape Array 5300—factory racked	C7508BZ
HP Tape Array 5300 Power Supply Fan Kit	C7496B
HP DVD+RW Array Field Module	Q1592B

This 3U rack enclosure holds two full-height, four half-height, or one full-height and two half-height drive modules. The offline hot-swappable array allows you to replace drives without powering down the server. An optional redundant power supply and fan module is also available.

Note: see tape drive section for information on drive variants

HP StorageWorks Tape Autoloaders

This is where versatility and flexibility meet. HP StorageWorks Tape Autoloaders provide you with unattended backup that frees up your IT resources and minimizes the risk of human error.

HP StorageWorks DAT 72x10 Tape Autoloader
This offers simple unattended DAT backup with 10 cartridge slots, allowing for one cartridge each day plus a weekly cleaning cycle.

HP StorageWorks 1/8 G2 Tape Autoloader
This family is designed for basic data protection and provides cost-effective, easy-to-install unattended backup.

Ultrium 1760
1/8 G2 Autoloader

Ultrium 920
1/8 G2 Autoloader

Ultrium 448
1/8 G2 Autoloader

Ultrium 232
1/8 G2 Autoloader

DAT 72x10
Autoloader

Departmental

Remote office

Backup performance GB/hr (compressed*)

600
400
300
200
100
50

Backup capacity (compressed*)

> 1 TB   3 TB   5 TB   7 TB   < 12 TB

* Assumes 2:1 data compression

HP StorageWorks
DAT 72x10 Tape Autoloader

The HP StorageWorks DAT 72x10 Tape Autoloader is a low-cost, entry-level, automated tape backup solution for small and medium-sized businesses or remote offices with limited IT staff.

Key features and benefits

- **Reduced IT staff requirements:** backups can be scheduled to occur automatically at any time of day
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools
- **Low media cost:** uses the least-expensive tape media to help lower the cost of ownership
- **Highly reliable:** reduces manual administrative tasks and the risk of error in the backup process
- **Industry standard:** DAT offers a proven track record of reliability and assured investment protection
- **Easy disaster recovery:** OBDR and the Data Protector Express Bare Metal Disaster Recovery option can restore an entire system at the touch of a button, without the need for system disks or software CDs
- **Backward compatible:** reads and writes industry-standard DDS-3, DDS-4, and DAT 72 media
- **Broad compatibility:** supports many different servers, operating systems and backup software applications
- **Management and diagnostics:** tape drive management and performance optimization is simple with HP StorageWorks Library and Tape Tools software
- **Space efficient:** provides a 10-cartridge capacity in a 1U form factor

Technical specifications

Form factor	1U
Capacity (native/compressed*)	360 GB/720 GB
Number of drives supported	1
Number of slots	10
Maximum transfer rate (compressed*)	21.6 GB/hr
Interface	Ultra160 SCSI LVD/SE
Dimensions (HxWxD in.)	1.7 x 17.6 x 31.2
Weight	23.6 lb

Ordering information

AE313B DAT 72x10 Tape Autoloader

* Assumes 2:1 data compression

HP StorageWorks 1/8 G2 Tape Autoloader

An ideal data backup solution for multiple servers, the 1/8 G2 Tape Autoloader is equipped with an Ultrium 1760 SAS, Ultrium 920 SCSI or SAS, Ultrium 448 SCSI, or Ultrium 232 SCSI tape drive.

Key features and benefits

- **High capacity**: up to 12.8 TB* of data with Ultrium 1760
- **High performance:** up to 160 MB/s* with Ultrium 1760
- **Simplified IT:** integrated Web-based remote management interface to manage the autoloader from across the room or across the world
- **Manageability:** integrated barcode reader to easily manage your media
- **Affordability:** automates the backup process at a price comparable to standalone drives
- **Investment protection:** migrate 1/8 G2 Tape Autoloader drives into HP StorageWorks MSL2024, MSL4048, or MSL8096 Tape Libraries as performance and capacity needs change
- **Compatibility:** works with leading operating systems and backup software
- **Reliability:** provides consistent backup and changes tapes automatically, minimizing the risk of operator error
- **Compact:** holds eight cartridges and one drive in a 1U rack space
- **Complete solution:** includes HP Data Protector Express Single Server Edition backup and recovery software, the Data Protector Express Bare Metal Disaster Recovery option, and HP StorageWorks Library and Tape Tools

Ordering information

AH163A 1/8 G2 Ultrium 232 Tape Autoloader
AH164A 1/8 G2 Ultrium 448 Tape Autoloader
AH165A 1/8 G2 Ultrium 920 Tape Autoloader
AH558A 1/8 G2 Ultrium 920 SAS Tape Autoloader
AK377A 1/8 G2 Ultrium 1760 SAS Tape Autoloader

Technical specifications

Form factor	1U
Capacity (native/ compressed*)	6.4 TB/12.8 TB with Ultrium 1760 3.2 TB/6.4 TB with Ultrium 920 1.6 TB/3.2 TB with Ultrium 448 800 GB/1.6 TB with Ultrium 232
Number of drives supported	1
Number of slots	8
Maximum transfer rate (compressed*)	576 GB/hr with Ultrium 1760 432 GB/hr with Ultrium 920 172.8 GB/hr with Ultrium 448 115.2 GB/hr with Ultrium 232
Interface	Ultra320 LVD/SE SCSI with Ultrium 920 3 Gb/s SAS with Ultrium 1760/920 Ultra160 LVD/SE SCSI with Ultrium 448/232
Dimensions (HxWxD in.)	1.7 x 17.6 x 31.2
Weight	25.4 lb

Note: all models can be rack mounted with an optional rack-mount kit

* Assumes 2:1 data compression

HP StorageWorks MSL Tape Libraries

HP StorageWorks Tape Libraries are flexible, scalable, manageable solutions for centralized backup to a single automated device.
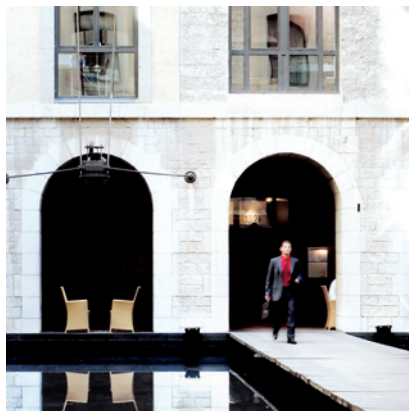
HP StorageWorks MSL Tape Libraries

HP StorageWorks Tape Libraries provide:

- Unattended backup that frees up your IT resources and minimizes the risk of user error
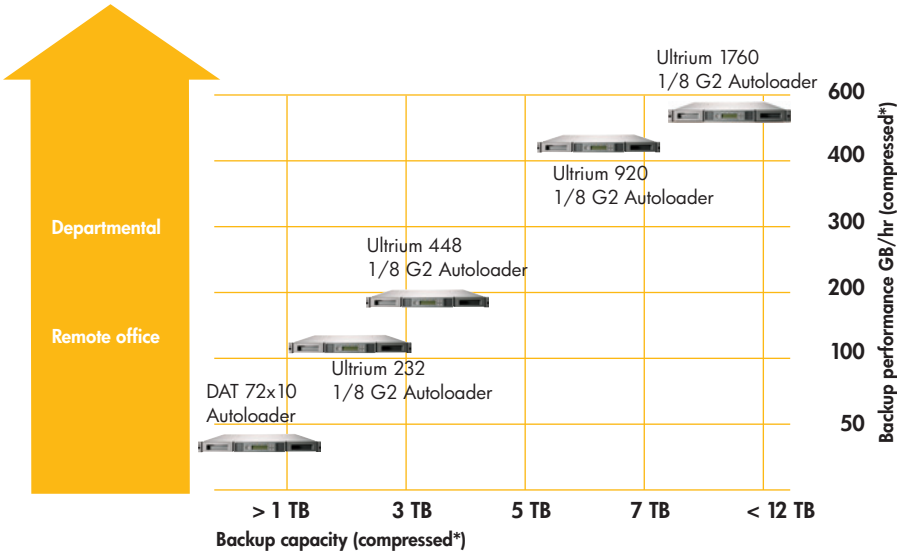- Investment protection with both capacity and performance upgrades for environments with unpredictable data growth
- Easy manageability with intelligent tools that streamline and simplify the backup process
- Compatible with industry-leading servers, operating systems, and backup software

For more information, visit: **www.hp.com/go/ebs**

Corporate/networked backup

Departmental

Remote office

MSL8096
MSL6060
MSL4048
MSL6030
MSL2024

Number of slots: 100 80 60 40 25 10

Total capacity: 35 TB   55 TB   75 TB   100 TB   165 TB
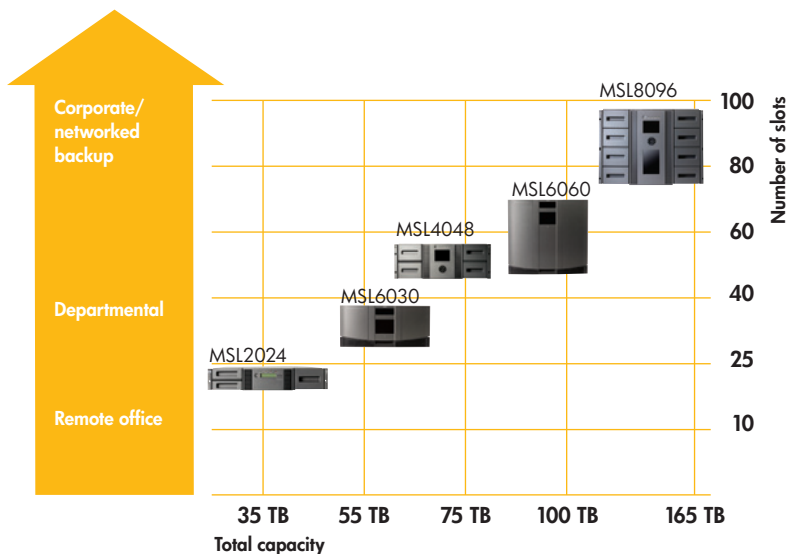
HP StorageWorks MSL2024/4048/8096 Tape Libraries

These tape libraries provide flexible and manageable solutions for centralized backup to a single automated device, freeing valuable IT resources for more strategic work.

Key features and benefits

- **Greater value:** provides exceptional storage density with up to 153.6 TB* of compressed capacity in the 8U form factor
- **Manageability:** integrated Web-based management features reduce the dependency on local IT resources, allowing multiple sites to be supported centrally
- **Investment protection:** you can choose from a broad range of LTO tape drives and increase capacity and/or performance easily with tool-free upgrades
- **Simplifies IT:** standard library features including a barcode reader provide faster inventory times and facilitate tracking of media
- **MSL2024:** the ideal entry-level tape library that combines tape library capacity and features in the compact form of a tape autoloader
- **MSL4048:** perfect for small to medium business, unattended workgroups, or remote offices, and backup and restore is easily managed from across the room or across the globe with browser-based remote management interface
- **MSL8096:** meets a broad range of demanding data storage needs, including unattended backup, archive, and disaster recovery for medium to large businesses, workgroups, or remote offices

Technical specifications

MSL2024

Form factor	2U
Capacity (native/ compressed*)	19.2 TB/38.4 TB with Ultrium 1840 19.2 TB/38.4 TB with Ultrium 1760 9.6 TB/19.2 TB with Ultrium 960/920 4.8 TB/9.6 TB with Ultrium 448
Max. number of drives	One or two Ultrium 1760/920/448 One Ultrium 960/1840
Number of slots	24
Maximum transfer rate (max. drives) (compressed*)	1.1 TB/hr with Ultrium 1760 864 GB/hr with Ultrium 1840 576 GB/hr with Ultrium 960 864 GB/hr with Ultrium 920 345.5 GB/hr with Ultrium 448
Interface	Ultra160 SCSI LVD/SE with Ultrium 448 Ultra320 SCSI LVD/SE with Ultrium 1840/960/920 4 Gb Native Fibre Channel with Ultrium 1840/960 3 Gb/s SAS with Ultrium 1760/920
Dimensions (HxWxD in.)	3.4 x 18.9 x 31.7
Weight	32.9 lb

* Assumes 2:1 data compression

Technical specifications

MSL4048

Form factor	4U
Capacity (native/ compressed*)	38.4 TB/76.8 TB with Ultrium 1840/1760 19.2 TB/38.4 TB with Ultrium 960/920
Max. number of drives	One to four Ultrium 1760/920 One or two Ultrium 960/1840
Number of slots	48
Maximum transfer rate (max. drives) (compressed*)	2.3 TB/hr with Ultrium 1760 1.7 TB/hr with Ultrium 1840 1.15 TB/hr with Ultrium 960 1.7 TB/hr with Ultrium 920
Interface	Ultra320 SCSI LVD/SE with Ultrium 1840/960/920 4 Gb Native Fibre Channel with Ultrium 1840/960 3 Gb/s SAS with Ultrium 1760/920
Dimensions (HxWxD in.)	6.9 x 18.9 x 31.7
Weight	47.2 lb

MSL8096

8U	
76.8 TB/153.6 TB with Ultrium 1840/1760 38.4 TB/76.8 TB with Ultrium 960/920	
Two to four Ultrium 960/920/1840/1760	
96	
3.4 TB/hr with Ultrium 1840 2.3 TB/hr with Ultrium 960/1760 1.7 TB/hr with Ultrium 920	
4 Gb Native Fibre Channel with Ultrium 960 Ultra320 SCSI LVD/SE with Ultrium 1840/960 3 Gb/s SAS with Ultrium 1760/920	
13.9 x 18.9 x 31.7	
102.7 lb	

* Assumes 2:1 data compression

Ordering information for MSL2024/4048/8096

Ordering information MSL2024

AG116A MSL2024 1 Ultrium 448 Drive Library
AG117A MSL2024 2 Ultrium 448 Drive Library
AG115A MSL2024 1 Ultrium 960 Drive Library
AG326B MSL2024 1 Ultrium 960 FC Drive Library
AH169A MSL2024 1 Ultrium 920 Drive Library
AH170A MSL2024 2 Ultrium 920 Drive Library
AH559A MSL2024 1 Ultrium 920 SAS Drive Library
AJ033A MSL2024 1 Ultrium 1840 Drive Library
AJ034A MSL2024 1 Ultrium 1840 FC Drive Library
AK378A MSL2024 1 Ultrium 1760 SAS Drive Library
AK379A MSL2024 Zero Drive Library

Ordering information MSL4048

AG322A MSL4048 1 Ultrium 960 Drive Library
AG323A MSL4048 2 Ultrium 960 Drive Library
AG324B MSL4048 1 Ultrium 960 FC Drive Library
AG325B MSL4048 2 Ultrium 960 FC Drive Library
AH171A MSL4048 1 Ultrium 920 Drive Library
AH172A MSL4048 2 Ultrium 920 Drive Library
AH560A MSL4048 1 Ultrium 920 SAS Drive Library
AJ035A MSL4048 1 Ultrium 1840 Drive Library
AJ037A MSL4048 2 Ultrium 1840 Drive Library
AJ036A MSL4048 1 Ultrium 1840 FC Drive Library
AJ038A MSL4048 2 Ultrium 1840 FC Drive Library
AK380A MSL4048 2 Ultrium 1760 SAS Drive Library
AK381A MSL4048 Zero Drive Library

Ordering information MSL8096

AH218A MSL8096 2 Ultrium 960 FC Drive Library
AH219A MSL8096 2 Ultrium 960 SCSI Drive Library
AH561A MSL8096 2 Ultrium 920 SAS Drive Library
AJ039A MSL8096 2 Ultrium 1840 Drive Library
AJ040A MSL8096 2 Ultrium 1840 FC Drive Library
AK382A MSL8096 2 Ultrium 1760 SAS Drive Library

Upgrade drives for MSL2024/4048/8096

AG118A MSL2024/4048 Ultrium 448 SCSI Drive
AH173A MSL2024/4048 Ultrium 920 SCSI Drive
AG327A MSL2024/4048/8096 Ultrium 960 SCSI Drive
AG328B MSL2024/4048/8096 Ultrium 960 FC Drive
AH562A MSL2024/4048/8096 Ultrium 920 SAS Drive
AJ041A MSL2024/4048/8096 Ultrium 1840 SCSI Drive
AJ042A MSL2024/4048/8096 Ultrium 1840 FC Drive
AK383A MSL2024/4048/8096 Ultrium 1760 SAS Drive

HP StorageWorks MSL6000 Tape Libraries

This product family provides a complete backup and restore solution for midrange and departmental environments, delivering performance, investment protection, and unparalleled flexibility.

Key features and benefits

- **Scalability:** multiunit stacking allows the libraries to grow using any combination of contiguous 5U and 10U MSL6000 tape libraries, for up to 240 slots and 16 drives in a 40U rack space that provides a maximum capacity of 384 TB*
- **Flexibility:** MSL tape libraries are available with either Fibre Channel or SCSI interfaces for use in direct or network-attached environments
- **Manageability:** the user-friendly GUI control panel and Web interface make library management easy from a remote or onsite location
- **Easy to use:** the libraries offer one (MSL6030) or two (MSL6060) configurable mail slots for quick load/unload and removal of magazines
- **High performance:** MSL6000 tape libraries provide the performance and capacity that are required to address increasing data volumes and decreasing backup windows
- **Reliability:** using LTO Ultrium drives and proven library robotics, MSL6000 tape libraries provide the necessary high reliability for today's demanding environments
- **Compatibility:** MSL6000 tape libraries are compatible with a broad range of operating systems, ISV packages, and hardware platforms to provide best-in-class interoperability

Technical specifications

MSL6030

Form factor	5U
Capacity (native/ compressed*)	24 TB/48 TB with Ultrium 1840 12 TB/24 TB with Ultrium 960
Max. number of drives	2
Number of slots	30
Maximum transfer rate (max. drives) (native/ compressed*)	864 GB/hr/1.7 TB/hr with Ultrium 1840 576 GB/hr/1.15 TB/hr with Ultrium 960
Interface	Ultra320 LVD SCSI 4 Gb Fibre Channel
Dimensions (HxWxD in.)	8.8 x 17.0 x 30.0
Weight	43.0 to 52.2 lb

MSL6060

Form factor	10U
Capacity	48 TB/96 TB with Ultrium 1840 24 TB/48 TB with Ultrium 960
Max. number of drives	4
Number of slots	60
Maximum transfer rate	1.7 TB/hr/3.4 TB/hr with Ultrium 1840 1.15 TB/hr/2.3 TB/hr with Ultrium 960
Interface	Ultra320 LVD SCSI 4 Gb Fibre Channel
Dimensions	17.5 x 17.0 x 30.0
Weight	95.0 to 104.2 lb

* Assumes 2:1 data compression

HP storage media

You need to know that your media gives you the best recovery in the industry. HP understands that there are no second chances when it comes to data recovery—the smallest imperfection could ultimately put someone out of business. All HP media is tested and certified for all StorageWorks drives and automation solutions.

Why choose HP storage media?

- More businesses store their data on HP-branded LTO, SuperDLT, DLT, and DDS cartridges than on any other media brand.
- No other brand of storage media is tested so extensively for optimum quality, reliability, and performance on HP drives and libraries.
- HP guarantees the highest level of restore reliability with media specifications that far exceed industry standards. In tests, HP media delivered three times the number of successful backup and restores compared to another leading brand.
- HP storage media is guaranteed to be compatible with certified drives and libraries from all other manufacturers. For additional information on storage media, visit: **www.hp.com/go/storagemedia**

Drive type	Cartridge capacity (compressed)	Data cartridge	Cleaning cartridge
DAT 24	24 GB	C5708A	C5709A
DAT 40	40 GB	C5718A	C5709A
DAT 72	72 GB	C8010A	C5709A
Ultrium 230, 232	200 GB	C7971A	C7978A
Ultrium 448, 460	400 GB	C7972A	C7978A
Ultrium 960, 960 WORM	800 GB	C7973A	C7978A
Ultrium 1840	1.6 TB	C7974A	C7978A
SDLT 320	320 GB	C7980A	C7982A
SDLT 600	600 GB	Q2020A	C7982A

HP labeled media for automation
- For automation customers, HP sells Custom Labeled and Non-Custom Labeled data cartridges: high-quality HP-branded storage media with a TriOptic bar code label.
- Choose Custom Labeled media when you need to specify the exact sequence of bar codes for your backup system.
- Choose Non-Custom Labeled media when you need fast delivery "off the shelf." Bar codes are never duplicated but sequences are randomized.

Drive type	Custom Labeled	Non-Custom Labeled
LTO1	C7971AL	C7971AN
LTO2	C7972AL	C7972AN
LTO3 RW	C7973AL	C7973AN
LTO3 WORM	C7973WL	N/A
LTO4 RW	C7974AL	C7974AN
LTO4 WORM	C7974WL	N/A
SDLT I	C7980AL	N/A
SDLT II	Q2020AL	N/A

HP Storage Media Kits
- HP Storage Media Kits provide a complete solution for HP LTO and DAT users at a price that is about 5 percent less expensive than the cost of purchasing all of the components separately.*
- Each kit contains 14 DAT or 20 LTO data cartridges, a DAT or LTO cleaning cartridge, as well as a complete set of tools to make backup part of your everyday business routine:

Drive type	Storage Media Kit
LTO1	C8013A
LTO2	C8014A
LTO3 RW	C8017A
DAT 72	C8012A

* Based on product list price

HP StorageWorks
tape storage compatibility

HP's extensive compatibility testing program helps ensure that HP StorageWorks tape drives and tape automation products work with leading servers, operating systems, and backup applications—and not just those sold by HP.

Our tape solutions work seamlessly in many environments, making them especially suitable if you have a mixed-system environment. For the latest list of servers, workstations, operating systems, and backup software that support HP StorageWorks tape drives, check the tape backup compatibility pages at: **www.hp.com/go/connect** or **www.hp.com/go/ebs**

For tape media compatibility, visit: **www.hptapecompat.com**

Compatibility with HP servers

- **HP ProLiant**
- **HP Integrity**
- **HP 9000**
- **HP AlphaServers**
- **HP Workstations**

Compatibility with non-HP servers

- **Dell**
- **IBM**
- **Sun**
- **Other third-party chip-sets—Adaptec, LSI**

Note:
HP does not support One-Button Disaster Recovery on non-HP systems. HP does not support SDLT or DLT VS technology on non-HP systems.

Compatible operating systems and software

Operating systems include Microsoft Windows Server, Windows 2000, and Windows XP; HP-UX; Novell Netware; Red Hat Linux; Sun Solaris; IBM AIX; Tru64 UNIX®; OpenVMS; and SCO.

Backup software applications include HP Data Protector and Data Protector Express software, CA BrightStor ARCserv, Symantec Backup Exec, Veritas NetBackup, Yosemite TapeWare, Legato NetWorker, Dantz Retrospect, IBM Tivoli, Ultrabak, and Columbia.

HP StorageWorks tape backup solutions connectivity chart

Category		Model	P/N	ProLiant servers											
				DL140 G3[1]	DL145 G3[1]	DL160 G5[1]	DL180 G5[1]	DL185 G5[1]	DL320 G5[1]	DL320 G5p[1]	DL320s[1]	DL360 G5[1]	DL365[1]	DL380 G5[1]	DL385 G2[1]
Internal tape drives	DAT	DAT 40 USB	DW022A	R	R	R	R	R	R	R	R	R	R	R	R
		DAT 40 SCSI	C5686C	R	R	R	R	R	R	R	R	R	R	R	R
		DAT 72 USB	DW026A	R	R	R	R	R	R	R	R	R	R	R	R
		DAT 72 SCSI	Q1522B	R	R	R	R	R	R	R	R	R	R	R	R
		DAT 160 USB	Q1580A	R	R	R	R	R	R	R	R	R	R	R	R
		DAT 160 SCSI	Q1573A	R	R	R	R	R	R	R	R	R	R	R	R
		DAT 160 SAS	Q1587A	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]
	Ultrium	LTO1 Ultrium 232 SCSI	DW064A	R	R	R	R	R	R	R	R	R	R	R	R
		LTO2 Ultrium 448 SCSI	DW016A	R	R	R	R	R	R	R	R	R	R	R	R
		LTO2 Ultrium 448 SAS	DW085A	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]
		Ultrium 448c Tape Blade	440947-B21												
		SB920c Tape Blade	AJ401A												
		LTO3 Ultrium 920 SCSI	EH841A	R	R	R	R	R	R	R	R	R	R	R	R
		LTO3 Ultrium 920 SAS	EH847A	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]
		LTO3 Ultrium 960 SCSI	Q1538A	R	R	R	R	R	R	R	R	R	R	R	R
		LTO4 Ultrium 1760 SAS	EH919A	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]
		LTO4 Ultrium 1840 SCSI	EH853A	R	R	R	R	R	R	R	R	R	R	R	R
		LTO4 Ultrium 1840 SAS	EH860A	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	R[3]
External tape drives	DAT	DAT 40 USB	DW023A	•	•	•	•	•	•	•	•	•	•	•	•
		DAT 40 SCSI	C5687D	•	•	•	•	•	•	•	•	•	•	•	•
		DAT 72 USB	DW027A	•	•	•	•	•	•	•	•	•	•	•	•
		DAT 72 SCSI	Q1523B	•	•	•	•	•	•	•	•	•	•	•	•
		DAT 160 USB	Q1581A	•	•	•	•	•	•	•	•	•	•	•	•
		DAT 160 SCSI	Q1574A	•	•	•	•	•	•	•	•	•	•	•	•
		DAT 160 SAS	Q1588A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
	Ultrium	LTO1 Ultrium 232 SCSI	DW065B	•	•	•	•	•	•	•	•	•	•	•	•
		LTO2 Ultrium 448 SCSI	DW017B	•	•	•	•	•	•	•	•	•	•	•	•
		LTO2 Ultrium 448 SAS	DW086A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
		LTO3 Ultrium 920 SCSI	EH842A	•	•	•	•	•	•	•	•	•	•	•	•
		LTO3 Ultrium 920 SAS	EH848A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
		LTO3 Ultrium 960 SCSI	Q1539B	•	•	•	•	•	•	•	•	•	•	•	•
		LTO4 Ultrium 1760 SAS	EH920A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
		LTO4 Ultrium 1840 SCSI	EH854A	•	•	•	•	•	•	•	•	•	•	•	•
		LTO4 Ultrium 1840 SAS	EH861A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]

ProLiant servers *(continued)*												
DL580 G4[1]	DL580 G5[1]	DL585 G2[1]	ML110 G4[2]	ML110 G5[2]	ML115[2]	ML150 G3[2]	ML150 G5[1]	ML310 G4[2]	ML310 G5[2]	ML350 G5[2]	ML370 G5[2]	ML570 G4[2]
R	•	R	•	•	•	•	•	•	•	•	•	•
R	•	R	•	•	•	•	•	•	•	•	•	•
R	•	R	•	•	•	•	•	•	•	•	•	•
R	•	R	•	•	•	•	•	•	•	•	•	•
R	•	R	•	•	•	•	•	•	•	•	•	•
R	•	R	•	•	•	•	•	•	•	•	•	•
R[3]	•[3]	R[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
R	•	R	•	•	•	•	•	•	•	•	•	•
R	•	R	•	•	•	•	•	•	•	•	•	•
R[3]	•[3]	R[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
R	•	R	•	•	•	•	•	•	•	•	•	•
R[3]	•[3]	R[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
R	R	R	R	R	R	•	•	R	R	•	•	R
R[3]	R[3]	R[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
R	R	R	R	R	R	•	•	R	R	•	•	R
R[3]	R[3]	R[3]	R[3]	R[3]	R[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
•	•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•	•
•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
•	•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•	•
•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
•	•	•	•	•	•	•	•	•	•	•	•	•
•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
•	•	•	•	•	•	•	•	•	•	•	•	•
•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
•	•	•	•	•	•	•	•	•	•	•	•	•
•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]

• Supported; for internal drives (includes rack-mount)

R Rack-mount only supported

Recommended solutions for this server

Not supported/not applicable

[1] HP SC11Xe SCSI Controller (412911-B21) is required for SCSI tape drives attaching to this server.

[2] HP Single Channel U320 SCSI Controller (374654-B21) is recommended for SCSI tape drives attaching to this server.

[3] HP SC44Ge Host Bus Adaptor (416096-B21) is recommended to attach SAS tape drives to this server.

To reference the latest connectivity data, go to:
www.hp.com/go/connect

HP StorageWorks tape backup solutions connectivity chart

Category		Model	P/N	ProLiant storage servers					
				DL160 G5 SS[1]	DL320 SS[1]	DL585 G2 SS[1]	DL380 G5 SS[1]	ML110 G5 SS[2]	ML350 G5 SS[2]
Internal tape drives	DAT	DAT 40 USB	DW022A	R	R	R	R	•	•
		DAT 40 SCSI	C5686C	R	R	R	R	•	•
		DAT 72 USB	DW026A	R	R	R	R	•	•
		DAT 72 SCSI	Q1522B	R	R	R	R	•	•
		DAT 160 USB	Q1580A	R	R	R	R	•	•
		DAT 160 SCSI	Q1573A	R	R	R	R	•	•
		DAT 160 SAS	Q1587A	R[3]	R[3]	R[3]	R[3]	•[3]	•[3]
	Ultrium	LTO1 Ultrium 232 SCSI	DW064A	R	R	R	R	•	•
		LTO2 Ultrium 448 SCSI	DW016A	R	R	R	R	•	•
		LTO2 Ultrium 448 SAS	DW085A	R[3]	R[3]	R[3]	R[3]	•[3]	•[3]
		Ultrium 448c Tape Blade	440947-B21						
		SB920c Tape Blade	AJ401A						
		LTO3 Ultrium 920 SCSI	EH841A	R	R	R	R	•	•
		LTO3 Ultrium 920 SAS	EH847A	R[3]	R[3]	R[3]	R[3]	•[3]	•[3]
		LTO3 Ultrium 960 SCSI	Q1538A	R	R	R	R	R	•
		LTO4 Ultrium 1760 SAS	EH919A	R[3]	R[3]	R[3]	R[3]	•[3]	•[3]
		LTO4 Ultrium 1840 SCSI	EH853A	R	R	R	R	R	•
		LTO4 Ultrium 1840 SAS	EH860A	R[3]	R[3]	R[3]	R[3]	R[3]	•[3]
External tape drives	DAT	DAT 40 USB	DW023A	•	•	•	•	•	•
		DAT 40 SCSI	C5687D	•	•	•	•	•	•
		DAT 72 USB	DW027A	•	•	•	•	•	•
		DAT 72 SCSI	Q1523B	•	•	•	•	•	•
		DAT 160 USB	Q1581A	•	•	•	•	•	•
		DAT 160 SCSI	Q1574A	•	•	•	•	•	•
		DAT 160 SAS	Q1588A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
	Ultrium	LTO1 Ultrium 232 SCSI	DW065B	•	•	•	•	•	•
		LTO2 Ultrium 448 SCSI	DW017B	•	•	•	•	•	•
		LTO2 Ultrium 448 SAS	DW086A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
		LTO3 Ultrium 920 SCSI	EH842A	•	•	•	•	•	•
		LTO3 Ultrium 920 SAS	EH848A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
		LTO3 Ultrium 960 SCSI	Q1539B	•	•	•	•	•	•
		LTO4 Ultrium 1760 SAS	EH920A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]
		LTO4 Ultrium 1840 SCSI	EH854A	•	•	•	•	•	•
		LTO4 Ultrium 1840 SAS	EH861A	•[3]	•[3]	•[3]	•[3]	•[3]	•[3]

AiO					c-Class blades						
AiO400²	AiO400f²	AiO400r²	AiO600²	AiO1200²	c3000 enclosure	c7000 enclosure	BL460c	BL465c	BL480c⁴	BL680c⁴	BL685c⁴
	•	R	•	R							
	•	R	•	R							
	•	R	•	R							
	•	R	•	R							
•	•	R	•	R							
	•	R	•	R							
	•[3]	R[3]	•[3]	R[3]							
R	•	R	•	R							
R	•	R	•	R							
	•[3]	R[3]	•[3]	R[3]							
					•	•	•	•	•[4]	•[4]	•[4]
					•	•	•	•	•[4]	•[4]	•[4]
R	•	R	•	•							
	•[3]	R[3]	•[3]	•[3]							
R	R	R	•	R							
	•[3]	R[3]	•[3]	R[3]							
R	R	R	•	R							
R[3]	R[3]	R[3]	•[3]	R[3]							
	•	•	•	•							
	•	•	•	•							
	•	•	•	•							
	•	•	•	•							
•	•	•	•	•							
	•	•	•	•							
	•[3]	•[3]	•[3]	•[3]							
•	•	•	•	•							
•	•	•	•	•							
	•[3]	•[3]	•[3]	•[3]							
•	•	•	•	•							
	•[3]	•[3]	•[3]	•[3]							
•	•	•	•	•							
	•[3]	•[3]	•[3]	•[3]							
•	•	•	•	•							
	•[3]	•[3]	•[3]	•[3]							

• Supported; for internal drives (includes rack-mount)

R Rack-mount only supported

Recommended solutions for this server

Not supported/not applicable

[1] HP SC11Xe SCSI Controller (412911-B21) is required for SCSI tape drives attaching to this server.

[2] HP Single Channel U320 SCSI Controller (374654-B21) is recommended for SCSI tape drives attaching to this server.

[3] HP SC44Ge Host Bus Adaptor (416096-B21) is recommended to attach SAS tape drives to this server.

[4] HP PCI Express Mezzanine Pass-Thru Card for HP BladeSystem c-Class (431643-B21) is required when installing a tape blade adjacent to a full-height server blade.

To reference the latest connectivity data, go to:
www.hp.com/go/connect

HP disk-based backup solutions

HP disk-based backup solutions provide easy integration of disk into your existing backup environment. The new HP StorageWorks D2D Backup System, Virtual Library Systems, and Data Protection Storage Servers dramatically improve backup and recovery performance of LAN and SAN servers.

The HP Virtual Library System 1000i is a disk-based backup solution that appears like a normal tape-based solution to the user. It emulates physical tape drives or autoloaders, making it ideal for most existing storage environments.

The HP StorageWorks D2D Backup Systems provide reliable, consolidated data protection for up to six servers in a single, self-managing device. They are designed to work with your existing backup software application to fully automate daily backup jobs, requiring less manual handling than tape-based systems.

To learn more about disk-based backup, go to: **www.hp.com/go/disktodisk**

D2D130 Backup System — 3 TB

High-end consolidation — 2.5 TB

D2D120 Backup System — 2 TB

Midrange consolidation

VLS1000i — 1.5 TB

D2D Backup System — 1 TB

Entry-level consolidation

.5 TB

Capacity

Speed GB/hr: 50 100 180 216
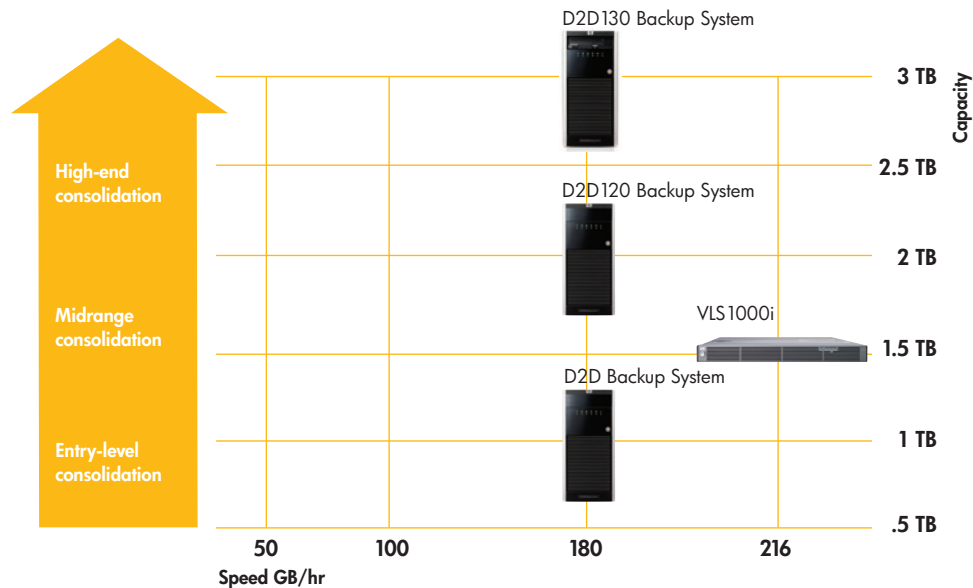
HP StorageWorks 1000i Virtual Library System

The HP StorageWorks 1000i Virtual Library System is a disk-based, iSCSI-connected storage solution that provides unattended backup and improved restore performance for midmarket, remote, or branch-office customers.

Key features and benefits

- **Unattended backup:** Automated backup of application and file data provides a more simple and reliable data protection strategy.
- **Improved efficiency and performance:** By emulating multiple tape devices, it can back up multiple servers simultaneously. Plus, disk-based storage simplifies and accelerates data restores from hours to minutes.
- **iSCSI connectivity:** Provides easy integration into existing Ethernet networks, which allows multiple servers to be configured with their own SCSI-connected virtual tape device.
- **Seamless integration:** Emulates both tape drives and tape autoloaders for easy and seamless integration to tape-based environments.
- **Streamlined media management:** Disk-based storage minimizes the problems and costs associated with tape media management.
- **Easy deployment and management:** Preconfigured for virtual tape applications and easily auto-discovered on the LAN during setup. Web-based management enables remote access to configuration and diagnostics.
- **High reliability:** These systems provide high reliability, thanks to HP ProLiant server technology, RAID 5 data protection and hot-pluggable drive technology.
- **Secure as tape:** As is the case with a tape device, there is no external file system or server operating system access to protect.
- **Ready-to-use:** Comes with a free copy of HP Data Protector Express Single Server Edition. Upgrades are available for larger configurations.

Technical specifications

Form factor	1U
Capacity (native/ compressed*)	1.5 TB/up to 3 TB
Max. number of virtual drives	Up to 12 HP Ultrium LTO2 tape drives (6 can be configured as HP 1/8 autoloaders)
Disk drive interface	Serial ATA (SATA)
Disk drive capacity/ type	500 GB, SATA 7,200 rpm
Number of disk drives	4
Storage controller	RAID 5
Interface	1 Gb Ethernet iSCSI
Performance	Up to 60 MB/s
Dimensions (HxWxD in.)	1.7 x 17.0 x 26.5
Weight	25.6 lb

Ordering information

AG124A VLS1002i Virtual Library System

* Assumes 2:1 data compression

HP StorageWorks D2D Backup System

The HP StorageWorks D2D Backup System is an easy-to-install, easy-to-use disk-based backup for small and medium businesses that automates daily backup for up to six servers and lets you restore users' files in seconds instead of hours.

The HP StorageWorks D2D Backup System works with your existing backup software application to provide automated backup for multiple servers at less than the cost of a single LTO tape autoloader. Consolidating your backups onto a self-managing, disk-based device reduces the risk of losing data. There are fewer devices to manage, and the intuitive, browser-based management interface also lets you monitor your backup device from anywhere at any time. The system can help to improve backup performance by supporting the direct backup of up to six servers simultaneously.

This simple solution fits right into your existing Windows or Linux environment, working with your current hardware and software in most cases. Existing tape drives and backup software may be used with the HP D2D Backup System. Alternatively, the system comes with an optional integrated LTO tape drive or with a Data Protector Express Software Kit that includes all of the components needed to protect up to four servers and automatically move or copy backups from the D2D Backup System to tape.

Key features and benefits

- **Simplicity:** Automating backup simplifies your data protection processes. Implementing unattended daily backup is especially good for businesses with limited IT resources.
- **Reliability:** Automation makes your data protection processes more dependable by reducing the risks of human error and problems associated with tape hardware and media—the two biggest causes of failed backups.
- **Affordability:** Scheduling daily backups to the HP D2D Backup System provides automated backup for up to six servers at less than the cost of a single LTO autoloader.
- **Fast restore:** Disk-based data protection provides online access to your backup data, allowing lost or corrupted files to be restored in minutes instead of hours or days.
- **Fast backup:** Backing up six servers simultaneously to a disk instead of one after the other to a tape drive or autoloader means that all backups get completed within your backup window.
- **Manageability:** A browser-based application lets you monitor your backup device from anywhere, locally or remotely, enabling you to check on available capacity, view and change device setup, add or change e-mail alerts, or copy backups to tape.

Technical specifications

	HP StorageWorks D2D110 Backup System	HP StorageWorks D2D120 Backup System	HP StorageWorks D2D130 Backup System
Processor	Intel Celeron® D processor	Intel Celeron D processor	Intel Celeron D processor
Capacity (useable/ raw)	750 GB/1 TB	1.5 TB/2 TB	2.25 TB/3 TB
Disk drive capacity/ type	250 GB, SATA 7,200 rpm	500 GB, SATA 7,200 rpm	750 GB, SATA 7,200 rpm
Number of disk drives	4	4	4
Storage controller	Software RAID 5	Software RAID 5	Software RAID 5
Interface	One 1 Gb iSCSI (Ethernet)	One 1 Gb iSCSI (Ethernet)	One 1 Gb iSCSI (Ethernet)
Performance	Up to 50 MB/s	Up to 50 MB/s	Up to 50 MB/s
Form factor	Tower	Tower	Tower
Dimensions (HxWxD in.)	14.6 x 6.9 x 17.3	14.6 x 6.9 x 17.3	14.6 x 6.9 x 17.3
Weight	26.5 lb	26.5 lb	26.5 lb

Ordering information

For current D2D110 and D2D120 users, a free firmware upgrade is now available that will enable you to update your system to the specifications stated above. Please use the firmware upgrade feature in the HP D2D Backup System device management interface to complete this upgrade.

HP software for data protection

HP software provides customized solutions that protect your customers' infrastructures and data.

With HP software and disaster-tolerant solutions, there is no problem if the weather, system glitches, or human error threaten to disrupt business.

The normal flow of business continues and your data is safe. HP customizes the solution to your data availability, replication, automation, and management requirements.

Data protection software

Business continuity software

Enterprise

Departmental

Remote office

Workstations

HP Data Protector software

HP StorageWorks Storage Mirroring

HP Data Protector Express software
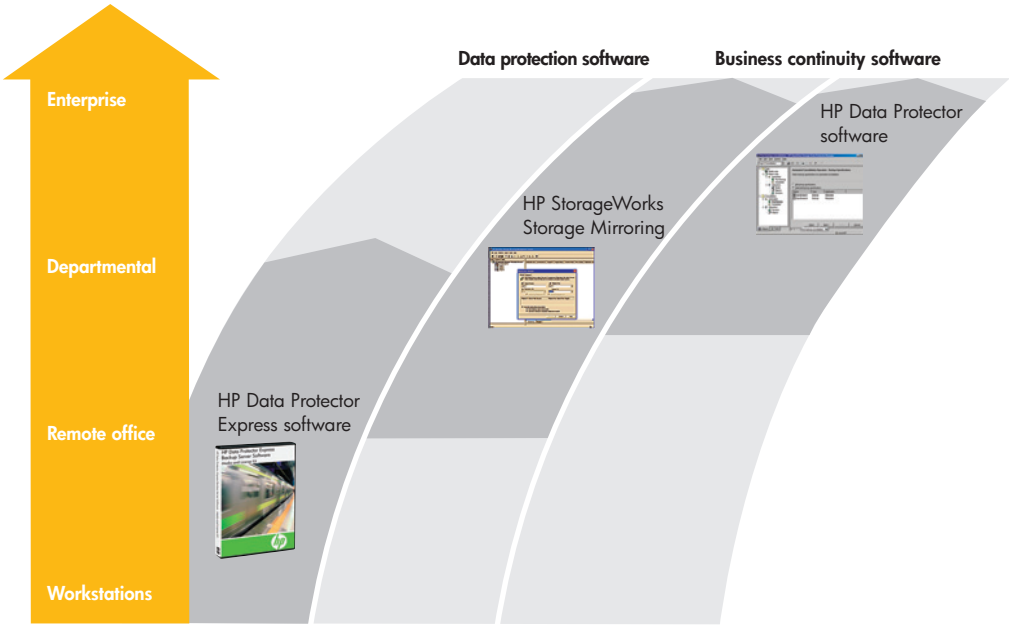
HP Data Protector Express software

Designed to be easy to install, easy to use, and easy to manage for nonspecialist staff, this is the ideal software for a single machine or a small network that needs robust data protection. HP Data Protector Express offers the flexibility to back up data to tape, disk, CD, or a hierarchy of these media. It provides advanced features without compromising its ease of use.
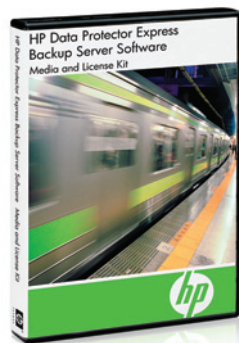
Key features and benefits

- Easy to install, configure, and manage without specialist staff
- Support for backup to disk, tape, and CD/DVD from Windows, Linux, and NetWare operating systems
- Includes secure backup data encryption to all supported media as well as support for HP LTO4 tape drive-based data encryption
- Can be extended easily with optional features when required
- Simple licensing structure: no complexities such as capacity-based licensing, per-processor licensing, or different licenses for different operating systems
- Special package for users of Microsoft Small Business Server operating systems

Note: HP Data Protector Express Single Server Edition (and the Data Protector Express Bare Metal Disaster Recovery option) is included with all HP StorageWorks tape drives and autoloaders. It is based on Data Protector Express and includes many of its features to provide robust protection of a single machine. Data Protector Express Single Server Edition can be upgraded easily to Data Protector Express by ordering a special part number that provides a significant discount to the regular price of Data Protector Express.

Ordering information

Base product

BB117EA HP Data Protector Express Backup Server

BB118EA HP Data Protector Express for Microsoft Small Business Server

Upgrade products (to get the Data Protector Express base product at a reduced price)

BB117ET Upgrade from HP Data Protector Express Single Server Edition

Options

For Data Protector Express options, see:
www.hp.com/go/dataprotectorexpress/options

To try Data Protector Express for 60 days or for more information about the product, visit: **www.hp.com/go/dataprotectorexpress**

HP Data Protector software

Scalable from single server to heterogeneous enterprise, this data management software automates high-performance backup and recovery from both disks and tapes—delivering maximum data protection while providing 24x7 business operations.
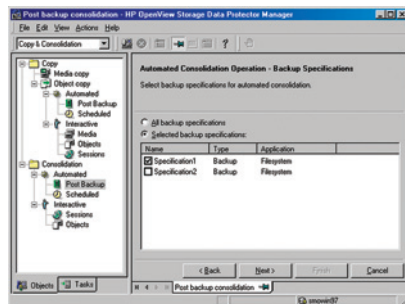
Key features and benefits

- **Robust and proven enterprise backup solution** used by more than 22,000 customers.
- **Low cost of ownership** responds to the pressure to reduce IT costs and achieve greater operational efficiency. A simple and flexible license model includes the first year of support.
- **Easy-to-deploy installation** is made simple with the capability for fully automated distribution of agent software to all connected clients and a centralized licensing facility that reduces complexity.
- **Outstanding integration** for HP environments that supports a broad range of heterogeneous environments.
- **Respond to the need for 24x7 application availability** by integrating techniques to eliminate backup windows. These include Online Backup, Open File Backup, and Zero Downtime Backup (local and remote replication).
- **Utilizing Instant Recovery,** Data Protector software meets the demands of the most complex enterprise businesses for specific recovery time and recovery point objectives, as well as enables terabytes of critical data to be recovered within minutes.
- **Unique, industry-first virtual full backup** reduces the time and resources needed to perform a full backup. By using "pointers" rather than duplicating data, HP Data Protector software improves tape utilization and provides heterogeneous data protection.

To try Data Protector software for 60 days or for more information about the product, visit the Data Protector Web site at: **www.hp.com/go/dataprotector**

Ordering information on Starter Packs

B6951AA HP Data Protector Starter Pack (license and DVD) for HP-UX

B6951DA HP Data Protector Starter Pack (license and DVD) for Sun Solaris

B6961AA HP Data Protector Starter Pack (license and DVD) for Windows

B6961DA HP Data Protector Starter Pack (license and DVD) for Linux

B6951BA HP Data Protector Starter Pack (license only) for HP-UX

B6951CA HP Data Protector Starter Pack (license only) for Sun Solaris

B6961BA HP Data Protector Starter Pack (license only) for Windows

B6961CA HP Data Protector Starter Pack (license only) for Linux

For complete ordering information, see the quickspecs: **www.hp.com/go/dataprotector**

HP StorageWorks Storage Mirroring

HP StorageWorks Storage Mirroring software is a host-based Windows application that performs continuous data replication and enables server failover over a customer's existing IP LAN or WAN.
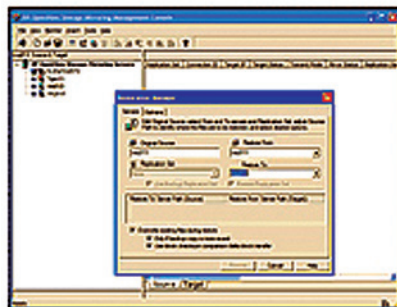
Key features and benefits

Business protection:
- Storage Mirroring protects business data, enabling restoration of data and the ability to failover servers within minutes to maintain a seamless working environment
- Provides extremely high levels of protection through stable performance, reduced latency and the ability to handle heavy amounts of data
- No distance limitations
- Real-time or scheduled replication

Cost effective:
- Provides the best continuous protection at the lowest cost
- Simple licensing model—licensed per server, according to the Microsoft operating system the server is running on, with no need to buy additional modules for different applications
- By replicating only the bytes that change, Storage Mirroring utilizes the absolute minimum bandwidth required to protect your data

Ease of use and installation:
- Allows companies even with limited IT expertise to install and maintain the solution, helping to ensure a high level of data protection and business continuity
- Simple-to-use management console with flexible GUI, central view of all HP StorageWorks Storage Mirroring servers and the ability to view as many or as few servers as desired
- Works on any type of storage design—DAS, NAS, and SAN, as well as on any Windows server platform that runs Windows—ProLiant, Integrity, or third-party servers
- When disaster strikes, Storage Mirroring can immediately reassign the source server identity to a target server

Ordering information

T5438A HP StorageWorks Storage Mirroring Server Edition 1 LTU

T5439A HP StorageWorks Storage Mirroring Server Edition 10 LTU

T5440A HP StorageWorks Storage Mirroring Enterprise Server Ed 1 LTU

T5441A HP StorageWorks Storage Mirroring Enterprise Server Ed 10 LTU

T5442A HP StorageWorks Storage Mirroring NAS Edition 1 LTU

T5443A HP StorageWorks Storage Mirroring NAS Edition 10 LTU

T5444A HP StorageWorks Storage Mirroring for 5 Virtual Machines 1 LTU

T5445A HP StorageWorks Storage Mirroring Itanium Server Edition 1 LTU

T5446A HP StorageWorks Storage Mirroring AiO Storage System Edition 1 LTU

T5447A HP StorageWorks Storage Mirroring Server Recovery Option 1 LTU

T5448A HP StorageWorks Storage Mirroring Linux Edition 1 LTU

T5449A HP StorageWorks Storage Mirroring Linux Edition 10 LTU

T5450A HP StorageWorks Storage Mirroring for VMware Virtual Infrastructure 1 LTU

Drive type		Internal drive	External drive	Hot-swap array module	Drive & rack enclosure	OD1 option available	Installation poster	HP StorageWorks CD	HP Data Protector Express SSE	HP StorageWorks L & TT Utilities	Screws
DAT 40											
DAT 40 Internal	C5686C	•				•	•	•	•	D*	•
DAT 40 External	C5687D		•			•	•	•	•	D*	
DAT 40 USB Internal	DW022A	•				•	•	•	•	D*	•
DAT 40 USB External	DW023A		•			•	•	•	•	D*	
DAT 40 Array Module	C7497C			•		•	•	•	•	D*	
DAT 72											
DAT 72 Internal	Q1522B	•				•	•	•	•	D*	•
DAT 72 External	Q1523B		•			•	•	•	•	D*	
DAT 72 USB Internal	DW026A	•				•	•	•	•	D*	•
DAT 72 USB External	DW027A		•			•	•	•	•	D*	
DAT 72 Array Module	Q1524C			•		•	•	•	•	D*	
DAT 72 1U Rack-mount	A7443A	•			•	•	•	•	•	D*	
DAT 160											
DAT 160 SCSI Internal	Q1573A	•				•	•	•	•	D*	•
DAT 160 SCSI External	Q1574A		•			•	•	•	•	D*	
DAT 160 USB Internal	Q1580A	•				•	•	•	•	D*	•
DAT 160 USB External	Q1581A		•			•	•	•	•	D*	
DAT 160 SCSI Array Module	Q1575A			•		•	•	•	•	D*	
DAT 160 USB 1U Rack Enclosure	AG703A	•			•	•	•	•	•	D*	
DAT 160 SAS Internal	Q1587A	•				•	•	•	•	D*	•
DAT 160 SAS External	Q1588A		•				•	•	•	D*	
Ultrium 232											
Ultrium 232 Internal	DW064A	•				•	•	•	•	D*	•
Ultrium 232 External	DW065B		•				•	•	•	D*	
Ultrium 448											
Ultrium 448 Internal	DW016A	•				•	•	•	•	D*	•
Ultrium 448 External	DW017B		•				•	•	•	D*	
Ultrium 448 Internal SAS	DW085A	•				•	•	•	•	D*	•
Ultrium 448 External SAS	DW086A		•				•	•	•	D*	
Ultrium 448 m Drive	DW019A			•		•	•	•	•	D*	
Ultrium 448 in 1U Rack (1 drive)	DW028B	•			•	•	•	•	•	D*	

Accessories

* D = Available as free download

SCSI terminator	Standard USB cable	Cable routing kit	USB cable for Proliant	Integral USB cable	SCSI ribbon cable	50-68-pin SCSI adapter	External SCSI cable	Power extender	Power cord	Internal SAS cable	SAS cable for Proliant	External SAS cable	HP DDS cleaning cartridge	HP DDS-4 data cartridge	HP DAT72 data cartridge	HP DAT160 data cartridge	HP Ultrium 1 data cartridge	HP Ultrium 2 data cartridge
					●	●		●					●	●				
●							●		●				●	●				
		●	●	●									●	●				
				●					●				●	●				
									●				●	●				
					●	●		●					●		●			
●							●		●				●		●			
		●	●	●									●		●			
				●					●				●		●			
													●		●			
									●				●		●			
					●	●		●					●			●		
●							●		●				●			●		
		●	●	●									●			●		
				●					●				●			●		
													●			●		
									●				●			●		
										●	●		●			●		
									●			●	●			●		
					●												●	
						●		●									●	
					●													●
						●		●										●
										●	●							●
									●			●						●
																		●
									●									●

Cables — **Media**

		Drive type					Accessories					
		Internal drive	External drive	Hot-swap array module	Drive & rack enclosure	OD1 option available	Installation poster	User manual & drivers	HP StorageWorks CD	HP Data Protector Express SSE	HP StorageWorks L & TT Utilities	Screws
Ultrium 920												
Ultrium 920 Internal	EH841A	•				•	•		•	•	D*	•
Ultrium 920 External	EH842A		•				•		•	•	D*	
Ultrium 920 Internal SAS	EH847A	•				•	•		•	•	D*	•
Ultrium 920 External SAS	EH848A		•				•		•	•	D*	
Ultrium 920 1U Rack	EH903A			•		•	•		•	•	D*	
Ultrium 960												
Ultrium 960 Internal	Q1538A	•				•	•		•	•	D*	•
Ultrium 960 External	Q1539B		•				•		•	•	D*	
Ultrium 960 Array Module	Q1540A			•		•	•		•	•	D*	
Ultrium 960 in 3U Rack (1 drive)	Q1595B	•			•	•	•		•	•	D*	
Ultrium 1760												
Ultrium 1760 Internal SAS	EH919A	•				•	•		•	•	D*	
Ultrium 1760 External SAS	EH920A		•				•		•	•	D*	
Ultrium 1760 SAS Rack-mount	EH946A	•			•	•	•		•	•	D*	
Ultrium 1840												
Ultrium 1840 Internal	EH853A	•				•	•		•	•	D*	•
Ultrium 1840 External	EH854A		•				•		•	•	D*	
Ultrium 1840 Array Module	EH926A			•		•	•		•	•	D*	
Ultrium 1840 in 3U Rack (1 drive)	EH856A	•			•	•	•		•	•	D*	
Ultrium 1840 SAS Internal	EH860A	•				•	•		•	•	D*	
Ultrium 1840 SAS External	EH861A		•				•		•	•	D*	
Tape Autoloaders												
DAT 72x10	AE313B					•	•	•	•	•	D*	
1/8 G2 Ultrium 232	AH163A					•	•	•	•	•	D*	
1/8 G2 Ultrium 448	AH164A					•	•	•	•	•	D*	
1/8 G2 Ultrium 920	AH165A					•	•	•	•	•	D*	
1/8 G2 Ultrium 920 SAS	AH558A					•	•	•	•	•	D*	
1/8 G2 Ultrium 1760 SAS	AK377A					•	•	•	•	•	D*	

* D = Available as free download

SCSI terminator	Rubber feet for tabletop	Cables	SCSI ribbon cable	External SCSI cable	Ethernet cable	Power cord	PDU power cord	Internal SAS cable	SAS cable for Proliant	External SAS cable	Media	HP Ultrium cleaning cartridge	HP Ultrium 3 data cartridge	HP Ultrium 4 data cartridge
			•										•	
				•		•							•	
								•	•				•	
						•				•			•	
						•							•	
			•									•	•	
				•		•						•	•	
												•	•	
						•						•	•	
								•						•
						•				•				•
						•								•
			•									•		•
				•		•						•		•
												•		•
						•						•		•
								•	•			•		•
						•				•		•		•
•	•			•	•	•	•							
•	•			•	•	•	•							
•	•			•	•	•	•							
•	•			•	•	•	•							
	•			•	•	•			•					
	•			•	•	•			•					

What's in the box

		Drive type	Rack-mount installation kit	OD1 option available	Accessories	Installation poster	User manual & drivers
MSL2024 Tape Libraries							
MSL2024 1 Ultrium 960	AG115A		•	•		•	•
MSL2024 1 Ultrium 448	AG116A		•	•		•	•
MSL2024 2 Ultrium 448	AG117A		•	•		•	•
MSL2024 1 Ultrium 960 FC	AG326B		•	•		•	•
MSL2024 1 Ultrium 920	AH169A		•	•		•	•
MSL2024 1 Ultrium 920 SAS	AH559A		•	•		•	•
MSL2024 2 Ultrium 920	AH170A		•	•		•	•
MSL2024 1 Ultrium 1760 SAS	AK378A		•	•		•	•
MSL2024 1 Ultrium 1840	AJ033A		•	•		•	•
MSL2024 1 Ultrium 1840 FC	AJ034A		•	•		•	•
MSL2024 0 Drive Library	AK379A		•	•		•	•
MSL4048 Tape Libraries							
MSL4048 1 Ultrium 960	AG322A		•	•		•	•
MSL4048 2 Ultrium 960	AG323A		•	•		•	•
MSL4048 1 Ultrium 960 FC	AG324B		•	•		•	•
MSL4048 2 Ultrium 960 FC	AG325B		•	•		•	•
MSL4048 1 Ultrium 920 SAS	AH560A		•	•		•	•
MSL4048 1 Ultrium 920	AH171A		•	•		•	•
MSL4048 2 Ultrium 920	AH172A		•	•		•	•
MSL4048 2 Ultrium 1760 SAS	AK380A		•	•		•	•
MSL4048 1 Ultrium 1840	AJ035A		•	•		•	•
MSL4048 1 Ultrium 1840 FC	AJ036A		•	•		•	•
MSL4048 2 Ultrium 1840	AJ037A		•	•		•	•
MSL4048 2 Ultrium 1840 FC	AJ038A		•	•		•	•
MSL4048 0 Drive Library	AK381A		•	•		•	•
MSL8096 Tape Libraries							
MSL8096 2 Ultrium 960 FC	AH218A		•	•		•	•
MSL8096 2 Ultrium 960	AH219A		•	•		•	•
MSL8096 2 Ultrium 920 SAS	AH561A		•	•		•	•
MSL8096 2 Ultrium 1840	AJ039A		•	•		•	•
MSL8096 2 Ultrium 1840 FC	AJ040A		•	•		•	•
MSL6000 Tape Libraries							
MSL6030 0 Drive Ultrium Library	AD597B		•	•		•	•
MSL6030 1 Ultrium 960	AD606B		•	•		•	•
MSL6030 2 Ultrium 960	AD607B		•	•		•	•
MSL6030 1 Ultrium 960 FC	AD608B		•	•		•	•
MSL6030 2 Ultrium 960 FC	AD609B		•	•		•	•
MSL6030 1 Ultrium 1840	AJ029A		•	•		•	•
MSL6030 1 Ultrium 1840 FC	AJ030A		•	•		•	•
MSL6060 0 Drive Ultrium Library	AD602B		•	•		•	•
MSL6060 2 Ultrium 960	AD610B		•	•		•	•
MSL6060 2 Ultrium 960 FC	AD611B		•	•		•	•
MSL6060 2 Ultrium 1840	AJ031A		•	•		•	•
MSL6060 2 Ultrium 1840 FC	AJ032A		•	•		•	•

HP StorageWorks CD	HP StorageWorks L & TT Utilities	SCSI terminator	Cables	Ethernet cable	External SCSI cable	0.5M LVD HDTS to LVD HDTS	Power cord	PDU power cord
•	D*	•		•	•	•	•	•
•	D*	•		•	•	•	•	•
•	D*	•		•	•	•	•	•
•	D*			•			•	•
•	D*	•		•	•	•	•	•
•	D*			•			•	•
•	D*	•		•	•	•	•	•
•	D*			•			•	•
•	D*	•		•	•	•	•	•
•	D*			•			•	•
•	D*			•			•	•
•	D*	•		•	•		•	•
•	D*	•		•	•		•	•
•	D*			•			•	•
•	D*			•			•	•
•	D*			•			•	•
•	D*	•		•	•		•	•
•	D*	•		•	•		•	•
•	D*			•			•	•
•	D*	•		•	•		•	•
•	D*			•			•	•
•	D*	•		•	•		•	•
•	D*			•			•	•
•	D*			•			•	•
•	D*			•			•	
•	D*	•		•	•		•	
•	D*			•			•	
•	D*	•		•	•		•	
•	D*			•			•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	
•	D*	•			•		•	

* D = Available as free download

What's in the box

		Drive type	Integrated Ultrium 448 SAS internal tape drive	Integrated Ultrium 920 SAS internal tape drive	Rack-mount installation kit	OD1 option available
Virtual Library						
1002i 2 TB Virtual Library System	AG124A				●	●
D2D Backup Systems						
D2D110 Backup System 1 TB	EH880A					
D2D110 Backup System 1 TB with Data Protector Express Software Kit	EH923A					
D2D110 Backup System 1 TB with Ultrium 448 Tape Drive	EH881A		●			
D2D120 Backup System 2 TB	EH884A					
D2D120 Backup System 2 TB with Data Protector Express Software Kit	EH924A					
D2D120 Backup System with Ultrium 920 Tape Drive	EH885A			●		
D2D130 Backup System 3 TB	EH950A					
D2D130 Backup System 3 TB with Data Protector Express Software Kit	EH951A					
D2D130 Backup System with Ultrium 920 Tape Drive	EH952A			●		

	Installation poster	User manual & drivers	HP StorageWorks CD	Quick restore & diagnostic CD	Device firmware CD	HP D2D backup system CD	HP Data Protector Express Software Kit	HP Data Protector Express D2D2Any option	End user license	HP Data Protector Express SSE (CD and LTU)	HP StorageWorks L & TT Utilities	Integrated HP SC44Ge Host Bus Adapter	Ethernet cable	Power cord	IEC power cord	Integrated SAS cable	HP Ultrium 2 data cartridge	HP Ultrium 3 data cartridge	HP Ultrium 4 data cartridge
	●	●	●	●	●				●	●					●				
	●	●				●				●			●	●					
	●	●				●	●	●					●	●					
	●	●				●				●	●	●	●	●		●		●	
	●	●				●				●			●	●					
	●	●				●	●	●					●	●					
	●	●				●				●	●	●	●	●		●		●	
	●	●				●				●			●	●					
	●	●				●	●	●					●	●					
	●	●				●				●	●	●	●	●		●			●

ProLiant Storage Servers	Drive type	Internal drive	External drive	Drive & rack enclosure	OD1 option available
HP ProLiant ML110 G5 Storage Server					
ML110 G5 320 GB SATA	AK303A	●			
ML110 G5 1 TB SATA	AK308A	●			
ML110 G5 2 TB SATA	AK313A	●			
ML110 G5 584 GB SAS	AK318A	●			
HP ProLiant DL160 G5 Storage Server					
DL160 G5 640 GB SATA	AJ672A	●		●	●
DL160 G5 1 TB SATA	AJ673A	●		●	●
DL160 G5 2 TB SATA	AJ674A	●		●	●
DL160 G5 3 TB SATA	AJ675A	●		●	●
DL160 G5 1.2 TB SAS	AJ676A	●		●	●
HP ProLiant ML350 G5 Storage Server					
ML350 G5 960 GB SATA	AE420A	●		●	●
ML350 G5 1.5 TB SATA	AE425A	●		●	●
ML350 G5 3 TB SATA	AE430A	●		●	●
ML350 G5 1.8 TB SAS	AG587A	●		●	●
HP ProLiant DL320s Storage Server					
DL320s 3 TB SATA	AG650A	●		●	●
DL320s 6 TB SATA	AG651A	●		●	●
DL320s 9 TB SATA	AG652A	●		●	●
DL320s 1.7 TB SAS	AG653A	●		●	●
DL320s 3.6 TB SAS	AG654A	●		●	●
HP ProLiant DL380 G5 Storage Server					
DL380 G5 base	AG815A	●		●	●
DL380 G5 1.6 TB SAS	AG816A	●		●	●
DL380 G5 4.5 TB SATA	AG817A	●	●	●	●
DL380 G5 9 TB SATA	AG818A	●	●	●	●
DL380 G5 1.8 TB SAS	AG819A	●	●	●	●
DL380 G5 3.6 TB SAS	AG820A	●	●	●	●
DL380 G5 x64 SAN	AG771A	●		●	●
HP ProLiant DL585 Storage Server					
DL585 G2 Unified SAN	AG630A	●			●
DL585 G2 Unified SAN w/factory rack	AG630A#0D1	●			●

	Installation poster	User manual & drivers	End-user license	Quick restore		Power cord
Accessories					**Cables**	
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•
	•	•	•	•		•

What's in the box

		Drive type	Internal drive	External drive	Drive & rack enclosure	OD1 option available
ProLiant Storage Servers *(continued)*						
HP StorageWorks All-in-One Storage Systems						
All-in-One 400t 1 TB SATA	AK298A		●		●	●
All-in-One 400t 584 GB SAS	AK293A		●		●	●
All-in-One 400r 1 TB SATA	AK224A		●		●	●
All-in-One 400r 2 TB SATA	AK225A		●		●	●
All-in-One 400r 1.2 TB SAS	AK226A		●		●	●
All-in-One 600 1.5 TB	AG538A		●		●	●
All-in-One 600 3 TB	AG543A		●		●	●
All-in-One 600 876 GB SAS	AG549A		●		●	●
All-in-One 600 1.8 TB SAS	AG727A		●		●	●
All-in-One 600 Tower to Rack Conversion Kit	AG546A		●		●	●
All-in-One 1200 3 TB SATA	AG655A		●		●	●
All-in-One 1200 6 TB SATA	AG656A		●		●	●
All-in-One 1200 9 TB SATA	AG657A		●		●	●
All-in-One 1200 1.7 TB SAS	AG658A		●		●	●
All-in-One 1200 3.6 TB SAS	AG659A		●		●	●
All-in-One SB600c 1 TB SAS Storage Blade Solution	AG780A		●		●	●

Accessories	Installation poster	User manual & drivers	End-user license	Quick restore	Cables	Power cord
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●
	●	●	●	●		●

Jargon buster

Cascading
The ability to connect switches to one another to create a larger SAN fabric.

CIFS, NFS, NCP, MAC, HTTP, and FTP
Protocols that allow machines to send information to one another over a network.

Clustering
The ability to group multiple servers for high availability or performance and appear to the user as one logical server (file server or application server). A server in a cluster is called a node, that is, four servers are a four-node cluster.

Compressed capacity
Compressed capacity is the amount of data processed or transferred by a device. This data may have been encoded in such a way as to compress it, by either software or hardware processing. The tape industry normally quotes a 2:1 compression ratio as the standard, but actual compression ratios vary greatly depending on the type of data being compressed and may be more or less than 2:1.

Data replication
The ability to replicate data to another system or site via either a LAN or SAN connect with Distributed File System (DFS). System administrators using this protocol can make it easy for users to access and manage files that are physically distributed across a network. Files appear to users as if they reside in one place on the network.

Digital Audio Tape (DAT)
A term used interchangeably with Digital Data Storage (DDS). It refers to the technology originally used for audio recording, which was adapted by HP and Sony in 1988 for data storage. DAT is an open format produced by multiple manufacturers.

Direct-attached storage (DAS)
Deployment of dedicated storage devices for each server. Disadvantages include inefficient storage use and allocation, and multivendor storage and management interfaces.

Disk-based backup

Disk-to-disk (D2D) backup solutions provide online access to your data, allowing lost or corrupted files to be restored in minutes instead of hours or days, thus reducing downtime and its impact on productivity. Two-stage backups, often called disk-to-disk-to-tape (D2D2T), combine disk-based and tape-based data protection to achieve the benefits of both.

Dynamic Data Rate Matching (DDRM)

Dynamic Data Rate Matching (DDRM) is a unique feature on all HP Ultrium drives that allows the speed of the tape to be varied to match the incoming data from the host. This maximizes write performance and minimizes tape repositioning.

Fibre Channel

The topology and transport protocol used to send block-level data information between server and storage.

Host bus adapter (HBA)

A PCI adapter that connects a server to the SAN fabric. Each HBA installed is referred to as a host.

Integrated Lights-Out (iLO) management

Selected HP ProLiant storage servers provide embedded lights-out technology, which enables users to perform a full range of management tasks without physically being in front of the server. Find out more at: **www.hp.com/servers/ilo**

IP and iSCSI protocol

iSCSI is a new networking protocol similar to the Fibre Channel protocol, but which uses standard Ethernet-based Internet Protocol (IP) networks. iSCSI is particularly interesting for small environments with lower performance requirements.

Linear Tape-Open (LTO)

A magnetic tape format technology developed as an alternative to DLT by a consortium of HP and other manufacturers. The first generation of LTO cartridge (LTO1) was released in 2000 with a native storage capacity of 100 GB. The latest generation is LTO4, which provides 800 GB of native capacity per data cartridge.

Native capacity

Native capacity is the actual number of bits and bytes that a device or a piece of media can store without considering data compression.

Jargon buster

Near-online

Technology that uses disk-based storage devices to store infrequently accessed data. This includes tiered storage environments or disk-to-disk-to-tape backup. Near-online is often implemented with low-cost disk drives. However, their ability to match requirements needs to be verified.

Redundant Array of Independent Disks (RAID)

A method of writing data simultaneously over multiple disk drives used in disk arrays for increased data protection and/or increased performance.

Replication

Mirroring data between two arrays—usually located in separate data centers—to achieve the highest availability in case of failure of one data center. This can be achieved via host/IP-based replication or—for enterprise arrays such as EVA or XP—via SAN-based replication directly between two arrays.

RTO and RPO

The Recovery Time Objective (RTO) is the amount of time a business process can be down. The Recovery Point Objective (RPO) is the amount of data a business can afford to lose. For 24x7 applications, the RPO could be the most recent transaction, whereas for file servers it could be last night's backup.

SAN fabric

The hardware that connects workstations and servers to storage devices in a SAN. The SAN infrastructure enables any-server-to-any-storage-device connectivity through Fibre Channel switching.

Serial Advanced Technology Attachment (SATA)

Interface technology for disk drives, providing the lowest cost per megabyte—ideal for storing low-usage reference information (an increasing regulatory requirement). SATA provides basic reliability and performance (based on an eight-hour and 10 percent to 30 percent duty cycle) compared to SCSI (and Fibre Channel) HDDs, which are more advanced, providing a 24x7 and 80 percent to 100 percent active duty cycle (read/write).

Serial Attached SCSI (SAS)

A next-generation SCSI interface that uses serial technology.

Small Computer System Interface (SCSI)

A protocol used to communicate with SCSI devices. It is also used by Fibre Channel technology to communicate with disk drives.

Snapshot

The ability to duplicate data within a server, NAS device, or RAID Array and promote it as a copy of data while utilizing minimal disk space.

Storage area network (SAN)
High-speed, special-purpose network connecting different data storage devices to servers. May extend to multiple or remote locations for backup and archival storage.

TOE card (TCP/IP Offload Engine)
Network cards that offload network protocol tasks from the standard server CPUs.

Ultrium
A high-capacity tape format based on LTO technology. It is an open format used by multiple manufacturers that provides enhanced performance and reliability over earlier formats.

Virtual Tape
Virtual tape is a disk-based technology that emulates one or more tape drives, autoloaders, or libraries. A virtual tape device appears to the backup software and other devices on the network as a tape device, and its type depends on its configuration.

Virtualization
Technologies that help remove physical storage boundaries by treating all available storage, regardless of its location, as one "virtual" pool.

Write-Once, Read-Many (WORM)
A data storage technology that allows information to be written to storage media only once. It is used to prevent data from being altered or erased and it helps organisations meet regulatory requirements for retaining data securely in an unalterable format. Data can be appended but not changed or overwritten.

HP Care Pack Services

Scalable, flexible, dependable—just like your storage.

Your storage is evolving. Now you can have the scalable support that evolves with it. HP Care Pack Services is an easy-to-buy, easy-to-use family of packaged services covering your lifecycle needs. You can rely on our highly skilled, HP-certified professionals to provide the expertise that spans leading storage technologies, and work side by side with you for better results. They will reduce the cost and complexity of defining, implementing, managing and improving your increasingly crucial storage processes. Push services beyond expectations and choose support that meets the changing needs of your business with the same reliability, scalability, and flexibility you demand of your storage.

Choose from the following range of services:

- **HP Storage Deployment**—Installation & Startup, Implementation, Data Center Service, Per-Event Services
- **HP Storage Support Services**—Hardware, Software Support Services, Mission Critical Storage Support Services, Multivendor Environment Support Services
- **Solution Service Capabilities**
- **HP Storage Education and Financial Services**

HP Care Pack Services resources

To find out more about HP Storage Services, contact your local HP sales representative,

Authorised Channel Partner, or visit the following sites:

- For HP Care Pack Services, visit: **www.hp.com/hps/carepack**
- For HP SAN Solution Services, visit: **www.hp.com/hps/storage**
- For HP Care Pack Education Services, visit: **http://education.hp.com/carepack**
- For HP Fibre Channel switches and multi-protocol routers, visit: **www.hp.com/go/san**

HP StorageWorks All-in-One Storage Systems

	Installation	3 Years	
		Support Plus	Support Plus 24
AiO400t, AiO400r	UF285E	UH167E	UH168E
AiO600		UE984E	UE985E
AiO1200		UG008E	UG009E

Services are only ordered as an Electronic HP Care Pack Services (xxxxx-E)

HP StorageWorks Modular Smart Arrays

	Installation	Installation & Start-up	HA upgrade kit (*)	NBD	4-Hour, 13x5 HW Support	4-Hour, 24x7 HW Support	6-Hour, CTR, 24x7
MSA20/30/50	U8132E	N/A	N/A	U8128E	U8129E	U8130E	U8131E
MSA60/70				UF301E	UF302E	UF303E	UF304E
MSA2000i/2000fc	U8132E	UA868E	N/A	UJ647E	UJ651E	UJ652E	UJ653E

N/A: Not Applicable

For more information, please visit: **www.hp.com/hps/carepack**

HP Care Pack Services

HP StorageWorks B-Series Infrastructure

Product family series	Warranty	Installation	3 Years, HW Support 4-Hour, 13x5	3 Years, HW Support 4-Hour, 24x7	3 Years, Support Plus	3 Years, Support Plus 24	3 Years, Proactive 24
Brocade series 8 ports	1 Year Next Business Day On-site	U5988E	U2088E	U2089E			
Brocade series 16 ports		U5988E	H4620E	H4621E			
Brocade series 32 ports		U5988E	UA259E	UA260E			
Brocade series 64 ports		U5988E	H5546E	H5547E			
Brocade series 16 ports Power Pack		U5988E			U5957E	U5958E	
Brocade series 32 ports Power Pack		U5988E			UF199E	UF200E	
Brocade series 64 ports Power Pack		SAN Solution Service				HA110A3	HA111A3
Brocade series 256 ports		U5988E	UC008E	UC009E			
Brocade series iSCSI Blade for 4/256 SAN Director		U5988E			UC019E	UC020E	
Brocade Blade SAN Switch 4Gb and 4/12 Series		U5988E	UE437E	UE438E			
Brocade Blade SAN Switch 4/24 Power Pack		U5988E	UD570E	UD571E			
Brocade Blade SAN Switch 4/24		U5988E	UC008E	UC009E			
Brocade Blade SAN Switch 4Gb Power Pack		U5988E			UE728E	UE729E	

HP StorageWorks C-Series Infrastructure

Product family series	Warranty	Installation	3 Years, HW Support 4-Hour, 13x5	3 Years, HW Support 4-Hour, 24x7	3 Years, Support Plus	3 Years, Support Plus 24	3 Years, Proactive 24
Cisco MDS 9020 Fabric Switch	1 Year Next Business Day On-site	U5988E	UF972E	UF973E			
Cisco MDS 9124e Fabric Switch for HP BladeSystem c-Class		U5988E	UG017E	UG018E			
Cisco MDS 9140 Fabric Switch		U5988E	U9280E	U9281E			
Cisco MDS 9216 series		U5988E	HA103A3	HA104A3			
Cisco MDS 9216i series		HA113A1	HA103A3	HA104A3			
Cisco MDS 95xx Series		SAN Solution Service				HA110A3	HA111A3
Cisco MDS 9000 PA Adapter		U5988E	U9919E	U9920E			
Cisco MDS 9222i Multi-service series		SAN Solution Service				HA110A3	HA111A3
Cisco MDS 9000 18/4 Module		HA113A1				HA110A3	HA111A3

HP ProLiant Storage Servers

	Installation	Installation and Start-up	3 Years	
			Support Plus	Support Plus 24
ML110 G5	U7986E	N/A	UH161E	UH162E
DL160 G5			UH173E	UH174E
ML350 G5			UB995E	UC544E
DL320s			UF990E	UF991E
DL380 G5 (base, standard OS)	U7986E	N/A	UC573E	UC574E
DL380 G5 (external SCSI/SATA, standard)			UE420E	UE421E
DL380 G5 (enterprise)	N/A	U9521E	UC573E	UC574E
DL380 G5 x64 SAN			UH069E	UH070E
DL585 G2			UF998E	UF999E

For more information, please visit: **www.hp.com/hps/carepack**

HP Care Pack Services

HP StorageWorks Tape Drives

	Installation	3 Years			
		Next Business Day	4-Hour, 13x5 HW Support	4-Hour, 24x7 HW Support	6-Hour Call-to-Repair, 24x7 HW Support
Low end					
USB DAT 24 (1-Year Parts Warranty)	U2090E	UD064E	UD065E	UD066E	U6358E
USB DAT 40, DAT 72 (3-Year Parts Warranty)		H3155E	H4616E	U2068E	U6358E
DAT 24, DAT 40, DAT 72, DLT VS80, DLT VS160 (3-Year Parts Warranty)		H3155E	H4616E	U2068E	U6358E
High end					
SDLT 320, SDLT 600, Ultrium 215, Ultrium 230, Ultrium 232, Ultrium 448, Ultrium 920, Ultrium 960, Ultrium 1840 (3-Year Parts Warranty)	U2090E	H3157E	H4617E	H4622E	U6359E

HP StorageWorks Rack-Mount and Tape Array Solutions

	Installation	3 Years			
		NBD, 9x5 HW Support	4-Hour, 13x5 HW Support	4-Hour, 24x7 HW Support	6-Hour Call-to-Repair HW Support
1U Rack-mount Kit	U2090E	UB136E	UB135E	UB137E	UB138E
3U Rack-mount Kit		N/A	H4618E	H4623E	U6368E
3U Rack-mount Kit with 2 DLT/SDLT or 1 LTO		U6335E	U6336E	U6337E	U9285E

For HP Care Pack Services, the 'box-level strategy' applies, i.e., the service is sold on the entire rack-mount and support applies to any number of drives inside, even if added at a later date.

HP StorageWorks Autoloaders and MSL Tape Libraries

	Installation	3 Years			
		NBD—Parts Exchange	4-Hour, 13x5 HW Support	4-Hour, 24x7 HW Support	6-Hour, 24x7 HW Support
DAT 72x10	U2090E	UE272E	UD849E	UD850E	
1/8 G2 Autoloader	U2090E	H2698E	H5526E	H4624E	U6367E
MSL2024	U4823E	UE293E	UE295E	UE296E	UE308E
MSL4048	U4823E	UE286E	UD834E	UD835E	UE307E
MSL8096	U4824E	N/A*	UF839E	UF840E	
MSL6030	U4823E	N/A*	U2860E	U2861E	
MSL6060	U4824E	N/A*	U2863E	U2864E	

* NBD—On-site Parts Exchange

HP D2D Backup System

HP D2D Backup System		Installation	3 Years						
			NBD—Parts Exchange	NBD, 9x5 HW Support	4-Hour, 13x5 HW Support	4-Hour, 24x7 HW Support	6-Hour Call-to-Repair HW Support	Support Plus	Support Plus 24
D2D Backup Solution with Data Protector SW	D2D 110 & D2D 120	UD056E	UE309E	UE314E	UE315E	UE316E	UE317E	UF831E	UF832E
	D2D 110 & D2D 120		UE309E	UE314E	UE315E	UE316E	UE317E	N/A	N/A

HP Virtual Library System

HP Virtual Library System	Installation	Installation and Start-up	3 Years		
			NBD—Parts Exchange	4-Hour, 13x5 HW Support	4-Hour, 24x7 HW Support
VLS1000i	UD056E	N/A	UE273E	UD819E	UD820E

HP ProLiant Data Protection Storage Servers

HP ProLiant Data Protection Storage Servers		Installation	3 Years	
			Support Plus	Support Plus 24
DL100	1TB	U7986E	UC990E	UC991E
DL100	3TB		UD413E	UD414E
DL100	6TB		UD422E	UD423E
DL380	9TB		UD431E	UD432E